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MAY, 1922

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HERPES CORNEA

EDUARD BOECKMANN
St. Paul, Minn.

The father of Ophthalmology, Albrecht von Graefe, who died in 1870, 42 years old, knew herpes corneæ, which he treated with calomel for the purpose of mechanically destroying the vesicles. The treatment would be more rational today, as we look upon herpes corneæ being an infectious disease and as we know that calomel has a chemical as well as mechanical action, liberating corrosive sublimate with the tears. About this treatment Saemisch (Bonn) writes in 1876, that it does not prevent new eruptions of herpes, and does not seem to shorten the process, and that atropin, which always is indicated, and compression, which is not always tolerated, has not the desired influence upon the run of the disease. He further mentions that iritis is a rare complication, that the tension is sometimes reduced, that the sensibility of the cornea is lowered, that the epithelization, the process of repair, is slow, and that we have no reliable treatment for the protracted painfulness of the disease.

The literature on herpes corneæ dates back to Horner (Zürich), who presented a paper on the subject at the ophthalmological meeting in Heidelberg in 1871. He reported 31 cases of genuine herpes corneæ after catarrhal affections of the respiratory tracts. In 28 of the cases herpes on lips and nostrils was also present. He also found reduced sensibility of the cornea and lowered intraocular tension. This particular form of herpes bears also his name: Herpes Corneæ catarrhalis sive febrilis Horneri.

From then on, the text books begin to recognize herpes corneæ as a clinical entity. About 50 text-books have been published since, and herpes corneæ figures today as corneal manifestation of neuritic disease of endogenous infectious origin. On one side we have the clinical picture of a corneal lesion, that everybody can see. On the other side we have a neuritis of the corneal nerves somewhere

in their course from Gasser's ganglion to the corneal epithelium, that nobody can see, but that the patient will feel, the doctor can demonstrate by examination of the corneal sensibility and which the pathologists have proven in post-mortem specimens.

This article is not written for a trivial presentation of a limited number of cases; it is written for the purpose of guiding the practitioner, who so often is the first man in the case; it is an unpretentious paper for the medical public at large. The experienced, up-to-date oculist has no need of this communication, while some of the men, who confine their practice to the diseases of the eye, ear, nose and throat, may welcome it, and this I have some reason to believe.

There are two principal forms of herpes corneæ: herpes febrilis and herpes zoster. These are apparently two different varieties. Herpes febrilis corneæ appears after febrile diseases with or without simultaneous eruption of herpes on the lips. Herpes zoster corneæ can not be traced back to a "cold" and is claimed by Hutchinson to be a part of herpes zoster ophthalmicus and should not occur on the cornea unless there are eruptions on the forehead and particularly on the nose along the naso-ciliary nerve. This theory has, however, not been generally accepted.

If we cannot trace herpetic eruption on the cornea back to a "cold" and do not see herpes zoster frontalis and nasalis, we accept a herpes simplex from unknown causes. In these "focal" times, bloodthirsty eyes look upon the teeth, tonsils and sinuses with intentional suspicion.

Finally, the various authors speak of keratitis dendritica as a disease identical with, or near related to, herpes febrilis, where the clinical picture in the cornea assumes a superficial ramifying appearance and runs a very chronic course over weeks and months,—in my opinion, ramification of an original herpes corneæ. This form of keratitis is of a later date than herpes febrilis and zoster. Hansen-Grut described it as dendriform (mycotic) keratitis.

Herpetiform affections of the cornea are sometimes observed after scratchings with finger-nails. I have just discharged such a boy, who had been tortured for three months and where I could demonstrate reduced sensibility. It happens that babies scratch their mother's eye, producing a painful keratitis. (Hansen-Grut, Copenhagen.)

With the visitation of influenza, herpes corneae febrilis and dendritic keratitis became of so frequent occurrence that I, for my part, had almost daily experience with one or another. This does not mean that I saw fresh or relapsing cases every day; neither does it mean that I only saw the febrile forms, nor the simple. It rather means that the herpes, in one form or another, usually covers a long course and that the next case reports while the preceding one is still under treatment and that they otherwise may come any part of the year—colds or no colds. The great rule was a preceding influenza.

As my material—most of it being, like myself, of Norwegian blood—comes from a distance, these patients have naturally and, as a matter of course, first consulted their home physicians; and every one came with a diagnosis of "ulcer,"—bandaged, covered up or with dark glasses, and all of them had uniformly been treated with argyrol, boracic acid, and atropin. The neuritic nature of the ulcer had not been diagnosed.

Argyrol—and I speak from experience—has become obsolete in my practice and is in my humble opinion worse than useless as an ocular therapeutic agent, being a dirty paint and little else. Its name is not even mentioned in the recent European textbooks (Rómer, Axenfeld, Schiek, Mayou, Fuchs). In Duane's American translation of Fuchs' Ophthalmology, argyrol is advertised in eight different places as a remedy in diseases of the conjunctiva, the lachrymal apparatus and after operations for cataract, but not in corneal diseases.

Boracic acid—the time-honored, venerable placebo, that never harmed any eye—may be useful for the removal of conjunctival secretions by flushing or bath, but, in itself, it is a remedy for nothing in the eye.

Atropin—the remedy much abused by the oculists and general practitioners alike—is our principal local remedy in diseases of the iris, but has no place in treatment of corneal troubles except under special conditions, which will be touched upon under the treatment of herpes.

Besides this local treatment with argyrol, boracic acid and atropin the patients in mention might have been properly relieved in their pains by appropriate medication (phenacetine, aspirin, quinine, narcotics). The bowels might have been freely opened to let out the enemy—an always appreciated operation to the patient. Perhaps, our patient has been advised to have his tonsils removed and his teeth extracted; but, this would be post festum. The damage was already done and the prevention of future relapses would only be a *pium desideratum*.

It is far from my intention to reflect upon the home doctor's diagnosis and treatment. Neither did I ever allow the patient to abuse him as an excuse for leaving him, nor was it necessary. It always pays to be charitable to one another and always remember that there will come another doctor after us and that there may be a day of reckoning. I would not say that the doctor's treatment was wrong, since he used non-irritating remedies; but it was mistaken treatment and did not hit the mark. And how can you expect any good from the treatment of corneal diseases with remedies for conjunctivitis and iritis? The wrong was that the treatment did not give the desired relief; so the patients came my way.

In his recent master-work, Heine* writes that the cornea, which possibly is the most sensitive organ in the whole body, can, for the same reason, sometimes be the very first organ to react upon noxae which affect the entire body and that particularly cerebral and meningeal irritations sometimes are solely disclosed in a corneal affection,—neuritic corneal diseases. To this group belong herpes corneae, keratitis dendritica, keratitis bullosa, herpes zoster ophthalmicus, keratitis neuroparalytica and, perhaps, dystrophia epithelialis (Fuchs).

In 25 carefully examined cases of such neuritic corneal diseases the lumbar pressure was normal only in 3 cases; in the other 22 the cerebral pressure was more or less increased. In 15 of the 25 cases the iris was involved. In 14 cases the intraocular tension was normal 6 times, increased 5 times and decreased 3 times. A careful test for corneal sensibility was made in 21 cases; in 7 cases it was intact outside the affected parts; 14 times it was reduced or extinct. In 11 cases the blood-pressure was increased 6 times, normal 5.

*Die Krankheiten des Auges in Zusammenhang mit der inneren Medizin und Kinderheilkunde. Von Professor Dr. L. Heine, Geheimer Medicinalrat, Director der Universitäts-Augenklinik, Kiel, Berlin, 1921.

Thus it seems to Heine that the neuritic diseases of the cornea frequently are symptoms of increased cerebral pressure. Because of the frequent iritic complications it is near at hand to think of a toxic or infectious noxa as the cause of the irritation in the meninges and the uvea, both of which present so many parallels. The question arises, he continues, whether the herpes and similar affections are dependent upon the increased cerebral pressure—what he is inclined to believe—or whether they possibly result from the noxa itself; whether they consequently present a parallel symptom to the increased cerebral pressure, as he might consider meningitis and uveitis as parallel symptoms. A certain decision in this question he seems to see in the effects of artificial reduction of the cerebral pressure. In fact, Heine believes he has seen sometimes quite evident favorable effects of lumbar puncture with shortening of the duration of the disease.

In other cases of non-neuritic corneal diseases, Heine could seldom and only to a small degree demonstrate increased intracranial pressure. This is very interesting and valuable information and is only one instance of the numerous individual teachings with which Heine's book is saturated and which, together with the generous illustrations, make an early translation into the English language timely and desirable.

Sattler (Leipsig) described, in the late seventies, pathological changes in a case of herpes zoster ophthalmicus. The root in the ganglion Gasseri for the first branch of the trigeminus, a ciliary nerve in the suprachoroidea and a place in orbiculus ciliaris showed inflammatory changes, while the second and third roots were normal. Gilbert (Munich) describes, in 1921, perineuritis and endoneuritis of the ciliary nerves on both sides of and in the ciliary ganglion, and chorioiditis next to a neuritic ciliary nerve in a case of herpes zoster. This observation explains to him the genesis of the herpetic uveitis, resulting from neuritis of the ciliary nerves and ganglion.

During the last two years the German ophthalmological literature is teeming with publications of researches made to demonstrate presence of herpes corneae virus and its nature.

Grüter (Marburg) rightly claims the priority of proving the infectious nature of the herpes febrilis vesicles. He succeeded numerous times in producing a corneal picture strikingly like dendritic kera-

titis by inoculation from herpes febrilis in men to the cornea in rabbits. He could inoculate back from the rabbits to blind human eyes with the same result. He never observed vesicles, but always changes in the sensibility. Bacteriological and cell studies gave negative results. Grüter believes the virus is specific, producing a necrosis of the epithelium and after a while also of the adjoining parenchyma. The vitality of the virus is low; it does not live long outside the organism and is very sensitive to changes in temperature. Experimental dendritic keratitis in rabbits healed much quicker than dendritic keratitis in men. His experiments date back to 1912.

Löwenstein (Prag) worked on the same subject about the same time. He inoculated the contents of herpes febrilis on the skin to the cornea in rabbits with positive results. Inoculation with herpes zoster vesicles on the skin was negative,—the same had been verified by others. By introduction of the herpetic virus in the anterior chamber of rabbits, he could produce severe iritis. He considers it probable, that many a case of obscure iritis might be of herpetic origin, the virus circulating in the blood. Immunity for months results from the inoculation. The virus is exceedingly active even in dilutions, but is very transient and could not be cultivated. The epithelial cells showed products of reaction to the penetrating virus.

Stocker (Bern) repeated Grüter's inoculations on the cornea in rabbits with material from herpes "febrilis" corneae in men. In all cases he obtained a typical dendritic keratitis with decreased sensibility of the cornea, but he never observed vesiculæ. Two of his animals died. Specificity of the virus he proved by negative control experiments and by positive inoculations from rabbit. He succeeded also in creating dendritic keratitis without inoculation of the cornea by only transferring the material to the conjunctival sac. The period of incubation was extended in these cases several days. What the specific virus really is—if it is a toxic product or a formed virus—could not be decided positively. The inoculability from animal to animal makes a formed virus more probable, but we are far from knowing the real offender. He recommends treatment with tincture of iodine (Friedenwald, Sidler-Huguenin) and zinc-iontophoresis (Wirtz, Stocker, Schnyder).

Kooy (Utrecht) repeated Löwenstein's experiments in the university eye-clinic, Amsterdam, and could verify them. She succeeded in obtaining cul-

tures, with which she could produce at will the typical dendritic keratitis. According to Miss Kooy, the smear showed a polymorph picture with variations of bacteria and fungi (mycobacteriaceæ).

Doerr and Vöchting (Basel) noticed that rabbits whose cornea had been inoculated with herpes virus sometimes developed constitutional symptoms from which they as a rule died and which had a striking likeness with the symptoms in rabbits inoculated with the virus of encephalitis epidemica.

Doerr and Schnabel (Basel) found, further, that the herpes virus not only produces local processes in rabbits but also a general infection, which localizes particularly in the central nervous system, and that pulp from such an infected brain can be transferred directly to the central nervous system or to the cornea of normal rabbits. They could further state that the virus circulates in the blood of the infected rabbits and that intravenously infected animals could suffer local processes in the cornea without inoculation. Consequently, the virus can not only generalize itself from the cornea but also metastasize in the cornea from the blood or lymph. They point to the apparent similarity between the herpetic constitutional infection in rabbits and the experimental encephalitis epidemica, which makes a near relationship, if not identity, between the two probable.

In a second article, Doerr and Schnabel call attention to the different virulence in the same herpes eruption according to the stage of the infection (first or fourth day). Most striking is the variation in virulency in the different strains. A valid variation between virulency and locality of the material could not be discovered. After recovery from herpes corneæ in rabbits, the animal remains immune for a long time; in men, relapses and new infections are not rare. This can not be explained any other way than that the virus is always present in such persons. They tried to demonstrate the presence of the virus on the lips, nostrils and in saliva and nasal secretions. The nasal secretion in rabbits on the corresponding side proved also to be virulent. In healthy individual the virus could not be detected in nasal secretions or in saliva. Saliva in an individual with fresh herpes labialis was found virulent. In dried-up herpes, the saliva was sometimes virulent, sometimes not. Only a certain percentage of herpetics are consequently herpes carriers. After herpes corneæ was healed, the virus remained in the saliva

—respectively, through five and one-half to seven and one-half weeks. In two cases of relapsing herpes corneæ, the saliva was not infected after recovery from the relapse; the nasal secretions also being negative. These results demonstrate that the infection of the skin, and probably of the cornea, can be contracted by the saliva; that the infectiousness of the saliva precedes the skin eruption and does not cease with the cure of the cutaneous and corneal infection; finally, that by habitual herpes the virus can remain in the saliva between the eruptions, making many a "herpetic" man a herpes-virus carrier with periodical autoinfection. The virus for epidemic encephalitis is also found in the saliva, nasal secretion and particularly in the salivary glands—a new proof of the hypothetic identity of herpes and encephalitis virus.

The herpes question is intense today. I could have quoted several other names, also, from this country. Almost every periodical brings contributions. What I have extracted from the literature is enough for my purpose and contains the essentials. I trust the future will disclose the real "rebel"; so far he keeps hidden and is undiscovered.

Thus the practitioner can save himself the trouble of making smears from the secretions or scrapings for microscopical examinations. Fortunately, bacteriological examinations are not needed, as we have unmistakable clinical evidences and data at our disposal for the diagnosis of herpes in its different stages and forms.

The blistering of the cornea—the vesicular keratitis—is in itself characteristic; and if the eruption, in groups or rows, was preceded by some kind of a "cold" (pneumonia, bronchitis, influenza, grippe, intermittens), and if "cold sores" on the lips or ala nasi were present, we have all reason to suspect herpes febrilis. As the vesicles rupture after a few hours, the disease is rarely seen in this stage and the picture is now that of an epithelial defect with shreds of necrotic epithelium adherent to the margin of the superficial ulcer, the bottom of which presents the Bowman membrane on a slightly opaque base. The epithelial defects are readily colored with fluorescein or, still better, with mercurochrome (fluorescein-mercury), either in a 2 per cent solution, and is usually of irregular shape. They could only be confounded with traumatic erosions, whose bases, however, are not opaque, and with eczematous keratitis, which is a children's dis-

ease and usually multiple. In herpetic erosions there is always hypesthesia or anesthesia of the cornea; in the others not.

Eruption of herpes corneæ takes place under marked irritative symptoms, ciliary injection, lacrimation, photophobia and ciliary pains. While the first three are more or less present in all forms of keratitis, the ciliary pain in herpes is characteristic because of its neuralgic character. While the pains of ordinary keratitis are localized to the cornea itself, the pains in herpes are irradiating along the inflamed ciliary nerves to the ganglion Gasseri (ciliary pains), so the patients suffer at the same time from eyeaches as well as frontal, meningeal headaches and need more than local applications for their relief; the pains may be very severe at different times of the day. This is extremely important to know, as headaches only occur in other corneal diseases, when the inflamed cornea is put under pressure, either extrabulbar (blepharospasm) or intrabulbar (increased intraocular tension), as may be the case in scrofular keratitis and serpentic ulcers.

Characteristic for herpes is also its torpidity and avascularity. As long as the disease is confined to the epithelium, no blood-vessels are either needed or desirable, as epithelization has nothing to do with corneal blood vessels. Ciliary injection is enough. But, if the disease extends into the substance of the cornea, vascularization is needed for fight, victory and repair—and will come. In these cases, permanent opacities will be the final result. If we can keep the cornea free from secondary infection or deeper invasion, good eyesight is assured.

The torpidity of herpes corneæ and the delayed epithelization has been laid to trophic influences and lack of vascularization. I do not see any necessity of catering to the hypothetical trophic nerves in this question. As long as the neuritis is active and as long as poisonous material with necrosing effect upon the epithelium filters out on the cornea and in the conjunctival sac, we can not expect epithelization, and as long as the disease is epithelial, vascularization is uncalled for. In this way I explain the torpidity that may extend through weeks and months.

The most characteristic symptom in herpes corneæ—the symptom which really stamped the disease as a neuritic keratitis and which took some time in recognition—is the ever-present anesthesia or hypesthesia of the cornea, confined to the affected areas or to the entire surface. Not enough

stress can be placed on the routine examination of the sensibility of the cornea in ocular diseases. The cornea is the most sensitive organ in the human anatomy to touch. Every cell has its nerve and the slightest touch brings a quick and powerful response from the lids under normal circumstances. Otherwise, the sensitivity of the cornea varies in different individuals and ages—the old cornea being less sensitive than the young. Heine, and also Stocker, recommend a pointed cotton applicator. I have adopted this and find it very convenient and effective. A little absorbent cotton rolled around the end of a match or toothpick and brought to a fine point serves the purpose and is always on hand. It must not touch the lashes. Both eyes should be tested for comparison.

A further characteristic of herpes corneæ is that it, as the great rule, spares children and the aged, and that it is almost without exception unilateral.

The foregoing remarks refer particularly to herpes febrilis; they hold good also for herpes simplex. Herpes zoster corneæ differs in some respects from herpes febrilis and simplex. Its infectiousness has not been proven by inoculations; until that time comes, we have to consider it a toxic affair; it is usually complicated with enormous herpetic eruptions on the forehead and along the nose, is more rare, but also more dangerous to the eye by uveal complications and may even lead to final enucleation. Besides, it does not spare old people. It is from specimens of herpes zoster that the pathologists have been enabled to examine the trigeminal nerve under the microscope.

If the practitioner will bear in mind the above named characteristic of herpes—the superficial affection, the neuralgic pains, the avascularity and particularly the decreased sensibility—he will have no difficulty in recognizing the real nature of the disease before him and he will not use the misleading name ulcer, but call it either a “cold-sore,” if it is herpes, or “shingles,” if it is dendritic keratitis or herpes zoster. He will know that he usually will have a long problem before him, but also that patience, prudence and tact are the first necessities to overcome the difficulties.

Herpetic keratitis (neuritis cornealis, Gilbert) is often complicated with herpetic iritis. This iritis can, like the keratitis, be of lighter or severer type, but it is always chronic. If it always is a descending uveitis or if it may result from invasion from without through the anterior chamber, I must leave to others to decide. The question is up today and

Gilbert (München) has been the first man to describe the typical symptom-complex in a series of 9 cases. Löwenstein has, as mentioned above, called attention to the possible herpetic character of iritis in obscure cases. I myself have under treatment a man who contracted an iritis on the one side 3 months ago, but apparently no keratitis, and who got a relapse the other day with simultaneous herpes eruption of the lip on the same side. He shows marked reduction of the corneal sensibility in the iritic eye. The tension of the eye is minus. I have another old man, who got herpes zoster frontalis and nasalis and iritis, but apparently no keratitis, a few months ago. He came to me with acute glaucoma, and extensive posterior synechia without iris bombé. The tension was +2. Atropin, massage and repeated paracentesis has reduced the tension. In this case the sensibility of the cornea is also markedly reduced. Therefore, be always on the lookout for herpes eruption anywhere and reduced corneal sensibility in one-sided, chronic iritis and spare the patients tests for syphilis and tuberculosis.

TREATMENT

What we have to deal with in a case of herpes corneae is a descending neuritis of different extent and intensity somewhere in the course of the first branch of the trigeminal nerve from Gasser's ganglion through the ciliary ganglion to the corneal epithelium,—a painful, infectious neuritis, whose toxine paralyzes more or less the sensibility of the cornea (anesthesia dolorosa), blisters the corneal epithelium in irregular foci, causes necrosis of the vesicles, which soon burst, leaving a superficial epithelial defect through which the poisonous material steadily filters, retarding epithelization, producing further epithelial invasion and destruction (keratitis dendritica) as long as the descending neuritis is active, and inviting invasion of the cornea itself and secondary infection. Besides, we have often complications with herpetic uveitis.

The primary trouble, the neuritis itself, is not accessible to direct treatment. Heine gives us hope of relieving the neuritis and shortening the course of the disease by spinal puncture. Since I read his book I have not had a new case of herpes corneae to try it on. Thus far I have tried to influence the neuritis with parenteral injections of milk. With 4 to 5 day intervals, I inject into the gluteal muscle successively 5, 7.5 and 10 grams of fresh milk, sterilized by boiling 5 minutes. This foreign

protein treatment is consequently no cure for neuritis, but I am under the definite impression that it sometimes is helpful. It was rather popular among the patients, who always were anxious to try anything and who never complained of the reaction and temporary discomfort. Internally, I tried to relieve the neuralgic pains with free use of aspirin, phenacetine, quinine, heat and narcotics. For rest and sleep I gave codeine and luminal. I regularly examined the urine for indican (chromaturia) and gave calomel in case the urine was toxic.

Turning to the other end of the question—the corneal manifestations—it seems to me that the safest, quickest and best treatment is curetting of the infectious eruption, followed by thorough disinfection of the entire eye, including the lids, with a reliable, penetrating, non-irritating germicide, as curetting alone is hardly a radical measure. Tincture of iodine, which has gained some ground for the disinfection of blisters, is a powerful germicide, but too irritating to the eye in general. I have chosen for my purpose the new, penetrating, only slightly irritating, powerful American germicide, mercurochrome, in 2 per cent solution. The operation is simple and harmless. The eye is anesthetized with holocain or cocain, whereafter the vesicles and shreds are scraped off with a cataract knife, curette or spud. As the operation is practically painless, speculum and fixation is seldom needed. The cornea and the conjunctiva, which also needs disinfection, is now flooded with mercurochrome, which will stain everything it comes in contact with, beautifully red, particularly the affected parts of the cornea, and deeply at that. The lids are also painted. The eye is covered up for the day with a light gauze-pad, anointed with 10 per cent noviform ointment to facilitate the drainage, and is fastened to the skin with plaster strips. An hour before the operation the patient is given 5 grains of phenacetine, $\frac{1}{4}$ grain codeine and $1\frac{1}{2}$ grains luminal to quiet him before and comfort him after the operation. The same preliminary I use with a great deal of satisfaction in all my operative eyework in adults.

Curettage and chemical disinfection with mercurochrome is repeated in case of new eruptions or further spreading. Mercurochrome is not a proper remedy for daily treatment, being a cell poison. When the field is once disinfected, I revert to my old treatment before the infectious discovery, with irrigation of the eye with the mildest anti-cocain drops with adrenalin added to deaden the

pain in the exposed corneal nerves, leaving out all septic solutions and with instillations of holocain bandaging except in certain cases and putting on dark glasses for general protection.

I have expressed as my opinion, that poisonous virus filters from the denuded surfaces to the detriment of the corneal epithelium, the cornea itself and the epithelization. As the virus is virulent, but very perishable once outside its abode, we must provide for its removal and escape from the eye, which we obtain—besides by curetting—by gentle irrigation with a mild antiseptic solution and by leaving out bandaging, which only tends to hold the secretions back. We prefer rather warm antiseptic irrigation or bathing, since we are told that the herpes virus is very sensitive to temperatures. Nature has provided that the eye constantly bathes itself in warm tears, which, as we know, have antiseptic properties; and that mechanism should not be interfered with by bandaging. Bandages are whitened sepulchres. They make an incubator out of the eye, increase and hold back secretions, cause swelling of the margin of the lids, not seldom with entropion of the lower. What bandage is necessary, the eye provides for itself. During day the patient, who always suffers from photophobia, keeps his eye more or less closed, but winks constantly and cleans his eye that way. During sleep the eye is consequently bandaged "in the natural way" and there is therefore more secretion in the eye in the morning than at night. That bandages should favor epithelization (which is claimed) is from my point of view illusory. We are warned against cocain in herpes corneae because of its destructive influence upon the corneal epithelium. This is a theoretical consideration. I have never seen ill effect from adding a little cocain to solutions I use for instillation and I very seldom notice any epithelial disturbance on normal cornea from a 1 per cent solution and I never go higher. Besides, the epithelial disturbance, if any, is quickly repaired. Some prefer holocain to deaden the corneal pains, but holocain, which is an antiseptic remedy, is more irritating; it acts more quickly than cocain, but is not without injurious effects on the corneal epithelium. Dionin in 5 per cent solution might relieve scleritic and iridocyclitic pains, but I have never found corneal pains relieved—on the contrary. I stick to cocain in herpes corneae preferably; there is no epithelium in the denuded foci to be hurt and there is no need of hurting the intact epithelium by excessive use of stronger solu-

tions. As cocain in watery solution is not a stable article, I dissolve the cocain in a mild antiseptic solution, to which I add adrenalin to support the effect of the cocain. This composition is popular with my patients.

In the first year of my practice, in 1874, I compounded the following eye-water, which I have used without change ever since, and which I always have in stock. Its formula is:

| | |
|---------------------------------|------------|
| Boiling Water | 1000 grams |
| Glycerite of Boroglycerine..... | 50 grams |
| Quinine Bisulphate | 1 gram |
| Zinc Sulphate | 5 grams |
| Hydrocyanic Acid, diluted..... | 15 grams |

Cool and filter.

This acidulated, mildly antiseptic, little irritating, fluorescing, stable solution, I use as such for irrigations, for bath, for instillations and as a menstruum for atropin, homatropin, scopolamin, eserine, pilocarpin, and cocain for preservation of indefinite sterilization of these drugs.

I like to treat my patients ambulatoric; I like to treat them myself twice daily in my office, where I have an equipped operating room with a graduate nurse in attendance; I like to treat them in a recumbent position on a high, narrow, padded operating table, convenient to the patient, nurse and to myself. The patients are all more or less sick after the preceding influenza, which leaves so many with reduced blood-pressure, slow pulse and general weakness, but they are not sick enough to go to hospitals or to stay in bed; they prefer to live in hotels, boarding-houses or with friends or relatives, where they live cheaper, are more independent; where the men can smoke and spit without restriction, discuss the American prohibition, Volstead's $\frac{1}{2}$ per cent dishwater, moonshine and wood-alcohol, and where the women can get all the coffee they want. I will on this occasion put myself on record as most emphatically disapproving of sick people, by a senseless prohibition, being deprived of the benefit of getting good beer and good wines, which they greatly need and which the most of them would highly appreciate. I don't feel the same way towards whiskey, which it is in my power to prescribe if I should take out the necessary license; this, I purposely have not done, because the inferior drug-store whiskey is not worth its price and because I have a good substitute, which is both cheaper and better and which I prescribe both for men and women. Its formula is:

Tinct. Nux Vomic.....gram 50
 Acid Phosphoric Dil.....gram 100
 Tinct. Gentian Comp.....ad. 500

Sig. One teaspoonful in a wine glass of water before meals. This prescription is my favorite substitute for beer, wines and whiskey, but it tastes differently; the patients take it but do not enjoy it and it does not produce the immediate content that beer, wines and whiskey do.

It depends upon the severity and virulency of the neuritis whether herpes corneæ is a mild one of a couple of weeks' duration or a severe one, lasting months. It also depends upon when the patient comes to treatment and—last, but not least—on the treatment itself. Ordinarily, the prognosis as to the conservation of good, useful, binocular vision is good, if we can prevent corneal destruction and secondary infection, which I think a rational treatment, based upon correct diagnosis, will do. Upon the severity and virulence of the neuritis the reparation of the corneal sensibility also depends and also, I believe, the frequency of relapses. The immunity after herpes corneæ is not lasting and the patients might return with relapses year after year. These relapses are, however, always of a milder type. It happens off and on that I am consulted for quiet unilateral corneal opacities which I can trace back to a once herpes corneæ because of reduced sensibility of the cornea. In severe cases, particularly after herpes zoster, the patients are for a long time troubled with abnormal sensations in the eye (paresthesia). Complete anesthesia, with destruction of the eye from neuroparalytic keratitis, I have never seen after herpes corneæ, so far as I remember. But during my long career it may have happened, that in earlier days I have enucleated blind, painful, degenerated eyes without having recognized the herpetic start of the trouble.

As yet I have not wasted any time on atropin, because it is entirely useless in corneal diseases except in cases of increased pressure upon the cornea from blepharospasm, which, however, seldom is pronounced in herpetic keratitis. If the patient should exercise an undue pressure on the diseased cornea by pinching of the lids, a full dilatation of the pupil by atropin, which means rest to the iris and ciliary body, will here, as it so often happens in children with blepharospasm for scrofular keratitis, reflect upon the spasm of the orbicular muscle. The best remedy for blepharospasm, canthotomy, was never resorted to or necessary in herpetic keratitis.

In the frequent complications of herpes corneæ with herpetic iritis, atropin comes to its right, not because it has any influence whatsoever on the iritis itself, but because it by dilating the pupil should prevent the formation and organization of posterior synechia and because it, in presence of already existing synechia, in combination with cocain will not only paralyze the sphincter but also stimulate the dilator and thus exercise an actual pull on the synechia, which will break them up in fresh cases.

In full dilatation by atropin in herpetic iritis, the iris and ciliary body is consequently at rest—a good surgical principle in inflammatory diseases—but the inflammation goes on all the same in spite of the "rest cure." If the dilatation is tried by atropin and cocain in conjunction, the rest cure is partly interrupted, as there is active pulling from both sides, on the synechias as well as on the root of the iris, which is so far advantageous, as it helps pulling the iris away from the filtration angle and actually helps the filtration.

In the earlier days we thought that atropin by its dilatation of the pupil brought about a compression of the pupil with depletion of the hyperemic condition, both arterial and venous, with antiphlogistic effect and reduction of the tension. This is entirely erroneous. In dilated condition the iris is simply folded upon itself and it weighs precisely the same as before the dilatation.

While dilatation with atropin under normal circumstances does not bring about any noticeable change in the intraocular tension, it is a notorious fact that full dilatation in acute irido-cyclitis often-times increases the intraocular tension and the misery of the patient by crowding the iris towards the filtration angle and blocking up the drainage more or less. This is, at least, what most of us believe at the present time, and this, I am sure, everybody has noticed. Under such circumstances many of us shift from atropin to eserine for a couple of days with relief to the patient and reduction of the hypertension, although the rest-cure is interrupted. The herpetic uveitis is, however, not of the acute type; it is chronic, but sometimes with acute exacerbation, and we have all we can do to prevent and break up posterior synechia, if it is at all possible, so there seldom will be any call on temporary miotics. In herpes cornea we must always be on the lookout for a complicating iritis, but not trouble the patient with atropin unnecessarily, because of the inconvenience of loss of accommodation and dazzled sight, which, however, is of minor importance in

the presence of a keratitis. Of greater importance is it to recognize the iritis so early that full dilatation is both possible and easy. Therefore, a diagnostic dose of atropin or, still better, of homatropin is often advisable, as it may be difficult to judge the condition of the iris through the more or less translucent cornea.

If iritis appears and the pupil dilates irregularly with atropin, atropinization should be pushed vigorously to full dilatation. We must remember that a diseased, more or less translucent cornea retards the absorption of atropin into the anterior chamber and, also, that we probably get better effect with instillations of drops in recumbent position with pressure on the lacrymal ducts and sac to prevent its absorption into the nose and throat. If repeated instillations of a 1 or 2 per cent atropin and cocain solution in the above mentioned eye-water should not accomplish full dilatation, I, for my part, use next 2 per cent atropin-alkaloid in castor oil or even the dry atropin powder. If posterior synechiæ form and organize in spite of such heroic treatment, it is not our fault and it is useless, or even hurtful to the conjunctiva and irritating to the iris, to push atropin any further. Dr. Frank Burch of St. Paul, who is probably known to all my prospective readers, tells me he has had prompt action in breaking up synechiæ by subconjunctival injection of a drop of 10 per cent cocain solution and atropin powder in the conjunctival sac. When the pupil is fully dilated, only enough atropin should be used to keep it dilated.

The routine I follow in the treatment of herpes corneæ runs at present thus: After having given the patient the before mentioned dope and anesthetized the cornea with 1 per cent cocain or holocain or both, I curette the vesicles, shreds, and spreads, flush the entire eye with 2 per cent mercurochrome solution, apply a light anointed pad and ask him to report in the afternoon. The pad is then removed, the eye irrigated with the above eye-water with a spacious dropper, whereafter a few drops of the following solution is instilled.

| | | |
|--------------------------------|------|-------|
| Rp. Boeckmann's eye-water..... | 10 | grams |
| Adrenalin | 5 | grams |
| Cocaini muriatici | 0.15 | grams |

He is now provided with darkened glasses, which he leaves off for the night. The same treatment is repeated twice daily. Only in cases of new eruptions or spreading—a not common occurrence—is

curettage and mercurochromization repeated. Atropin is used in iritic complications. The patients are advised to use hot water applications at intervals.

The intraocular tension in herpes corneæ is, as a rule, either normal or reduced. In case of increase, I do not hesitate in making paracentesis, which might be of some relief after the initial increase in tension, which always follows paracentesis for a day or two, subsides. Subconjunctival injections I have never resorted to; have in fact not much use for them; there is misery enough without them. Neither has anybody ever advocated them.

When the epithelization at last is completed and the pains gone, our work is practically done and the patients ready to be discharged. Still, nature has a long repair work to do for the nerves and the corneal sequelæ. It is no proof of the inflammation being over, that the eye is apparently at rest, the ciliary injection gone and the patient feeling tolerably well. We still have a keratitis, not only an opacity or a scar before us. Separate the lids and expose the eye to the air and the ciliary injection will promptly return. Compare with the other eye and you will see the difference.

When there is a sequela in the shape of nebecula, nebula, macula, or leucoma, the corneal inflammation is ended, but the corneal opacity will continue to clear up through months and years. As long as we, by exposure, can demonstrate the latency of the keratitis, treatment should be continued at home for so long a time as the patient has patience to keep on and thinks it beneficial. I give them to take along a small bottle of cocain-adrenalin-eye-water solution—not a large one, because the solution redens and loses its efficacy as a comforting remedy. But, I particularly give them some 10 per cent noviform ointment, with which to massage the cornea after having inserted some, by the aid of a glass applicator, in the conjunctival sac, which they soon learn. The affected nerves will have to take care of themselves; "vis medicatrix naturæ" is after all the doctor's and the patient's best friend. And it is wonderful how the opacities will clear up in time. Extensive iritic synechia may need more than nature's help—surgical interference.

I am indebted to Dr. Paul Berrisford and Dr. Frank Burch, both of St. Paul, for suggestions and patience with my English.

SUMMARY OF RECENT PROGRESS IN UROLOGY*

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During the last year or two there have been a number of interesting advances in the field of urology. It is my purpose to give a brief summary of the more important phases of the subject which have interested us at the Mayo Clinic.

Submucous ulcer of the bladder.—Among the contributions to the subject of urology which have caused the most widespread discussion is that by Hunner concerning submucous ulcer of the bladder. His claims have been largely substantiated and he deserves credit for calling our attention to the existence of a type of localized chronic submucous infection of the bladder which had heretofore been overlooked. To call the condition "ulcer" is somewhat unfortunate, however, since there is little evidence of actual ulceration in the mucosa of the bladder. Through the cystoscope the lesion appears as an irregular area of congestion, with cicatricial changes, which bleeds easily and may be very sensitive to touch. The area may be quite difficult to find, requiring a careful search with both lens and direct vision cystoscope. Strangely enough, the condition is most often found in women, and usually in the upper portion of the bladder. It is evidently the end result of a primary pyelonephritis and cystitis, although it may be a specific hematogenous infection of the submucous tissues in the bladder, as Bumpus and Meisser claim. The factors contraindicating operation are: persistence of renal infection, diffuse cystitis, and multiple areas of submucous infection scattered in various portions of the bladder. Before advising operation an attempt should be made to treat the areas with topical applications of silver nitrate and fulguration. Postoperative results have not been uniformly successful. Although almost every patient improved immediately after operation, many suffered a recurrence of symptoms at the end of from three to six months. A cure is, therefore, not certain until at least six months have elapsed after operation. Of equal importance to resection of the diseased area is the thorough removal of all possible

foci of infection, usually infected teeth and tonsils. The etiologic relation of these has been quite definitely shown experimentally by Bumpus and Meisser.

Wide stricture of the ureter.—Observations made by Hunner with regard to stricture of the ureter have not been generally substantiated. A wide stricture of the ureter may occasionally exist, but it is not found nearly so often as has been claimed. The so-called hang to the wax bulb on the ureteral catheter which has been described at the site of the suspected stricture can be explained by physiologic and anatomic reasons. Failure to demonstrate the existence of dilatation of the ureter and renal pelvis above the so-called stricture is a large factor in negating the hypothesis.

Stone in the ureter.—In recent years, stone in the ureter has been regarded more and more as a condition in which the stone either passes spontaneously, or is removed with the aid of the cystoscope rather than by surgery. Crowell has taken the extreme position stating that it is seldom necessary to operate for stone in the ureter. He has found it necessary only twice in a series of seventy-eight cases. A more conservative position is taken by Bugbee, who reports a series of 120 cases with operations in about twenty-five. In the Mayo Clinic it has been necessary to resort to operation in approximately 25 per cent of such cases.

The technic for the removal of stones by the aid of the cystoscope has been steadily progressing during the last few years. Besides displacing the stone by the manipulation of the ureteral catheter, probably the most important factor is the prolonged dilatation of the ureter which may be accomplished best by means of multiple indwelling ureteral catheters, as suggested by Crowell. A fair sized ureteral catheter is introduced into the ureter past the stone and is left in place for several days. Subsequently one or two catheters are inserted into the ureter along the side of the original catheter. These also remain in place for a day or two, when they are removed. As a result of this dilatation the stone usually is expelled during subsequent colic. Bugbee employs an ingenious method of inserting a soft ureteral catheter in such a manner as to wind it around the stone, thereby obtaining considerable traction. The use of papaverin, a derivative of opium, suggested by Macht, which paralyzes temporarily the smooth muscle fibers of the ureter, has been advocated by several observers. The value of

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drugs is more or less questionable, although they occasionally seem to be of some aid.

Focal infection of the urinary tract.—It has been generally recognized that foci of infection, for example those in the teeth and tonsils, may play an important part in the cause of infections of the urinary tract, and it has been the custom of careful clinicians to search for such foci and remove them when present. The importance of this has been emphasized by the work of Rosenow, and more recently by the experimental studies of Bumpus and Meisser, who injected into rabbits streptococci from the cultures obtained from diseased teeth and tonsils of patients with infections of the urinary tract, and produced infections similar to the original infection in the patient. For instance, in a case of chronic bilateral pyelonephritis, similar lesions in the kidneys of many rabbits were produced. In cases of submucous ulcer of the bladder they were able to reproduce similar lesions in the rabbit. The experimental corroboration of these theories is certainly of considerable clinical value and manifests the great importance of roentgenographic examination of the teeth, examination of the tonsils, and their removal should any evidence of infection be found.

It seems logical to conclude that, since bacteria are the direct etiologic factors in the formation of cholecystitis and gallstones, as shown by Rosenow, they should also be etiologic factors in the formation of urinary stones. Streptococci obtained from culture of the urine of a patient suffering from recurring lithiasis and injected into the pulps of teeth in six dogs caused the formation of renal stone in five. Alkaline phosphatic cystitis is the clinical condition which offers the most definite evidence that lithiasis has a bacteriologic origin. Meisser has recently demonstrated the formation of a phosphatic concretion in the bladder of a rabbit injected with streptococci obtained from an infected tooth of a patient suffering from alkaline phosphatic cystitis. It seems probable, however, that more than one factor is involved, since the chemical changes may be of equal etiologic importance. Keyser has been able to repeat the experiments made by Ebstein and Nicolaier, who produced urinary calculi in dogs and rabbits by the administration of oxamid. He found that a piece of dead muscle tissue, left in the pelvis of a dog's kidney for several months, became covered by a calcareous deposit, and concludes that urinary stasis is an important element in the formation of calculi.

The exact relation of chemical changes to bac-

teriologic infection remains obscure, but recent evidence leads us to believe that we may be on the way to unravel some of the mystery that surrounds the subject. In any event it would seem logical to conclude that infections in the teeth and tonsils should be regarded as very probable factors in the cause of lithiasis and should be carefully removed in order to prevent recurrence.

Value of radium in the urinary tract.—Radium applied in diseases of the genito-urinary tract has not met with the success hoped for. Encouraging reports of evident cure from observers who first used radium in the treatment of carcinoma of the prostate have not been corroborated by later experience. It is, however, often of palliative value and in many cases seems to retard the progress of the malignancy. Of the various methods of applying radium to the prostate, probably the most efficacious is the insertion of needles containing radium emanation. As described by Barringer these needles are injected through the perineum directly into the prostatic tissue. The suprapubic insertion of the needles following preliminary cystotomy, as described by Herbst, hardly seems necessary as a routine procedure. Radium applied through the rectum often causes considerable reaction. We have secured the best effects by thorough radiation of the prostatic tissue from all angles; that is, by applying the radium in needles directly into the prostatic tissues through the perineum, as well as by means of protected capsules inserted into the rectum and urethra. In using needles a comparatively small dosage is necessary and care must be taken that they are not inserted too close together. If there is insufficient space between the needles and if the dose is too great the prostatic tissue will slough. Our experience has demonstrated that radium should be given only in selected cases, and if there is evidence of extension beyond the prostatic gland, or of metastasis, radium therapy is of little value.

Bumpus has shown that one-third of the patients in the Mayo Clinic who have carcinoma of the prostate have metastasis to the bone. This was discovered by careful roentgen-ray examination of the entire spine, pelvis, and long bones. Many of the patients had little or no subjective or objective evidence of metastasis. Although the prostate often is markedly reduced in size as the result of radium, and may even disappear on rectal palpation, nevertheless, the degree of urinary obstruction is usually little diminished. In such cases, if the patients'

general condition and extent of prostatic involvement warrant, suprapubic removal of the obstructing portion of the gland may be indicated.

The use of radium as a primary measure in the treatment of carcinoma of the bladder has proved to be of value in some cases. It may, however, be employed to greatest advantage in conjunction with surgical measures. We now insert, through the cystoscope, directly into the growth and particularly into its borders, numerous minute glass tubes containing radium emanation. This is done preferably from two to three weeks before operation and as a result the neoplasm is often found contracted and fibrosed with well demarcated borders. During the period between the insertion of the radium emanation and the surgical removal of the growth the bladder is washed daily. This not only removes the slough from the radiated tumor, but also reduces the infection so commonly associated with malignancy of the bladder. Radium in these cases is used with the intention not of completely destroying the growth, but of reducing the potential malignancy of fragments not removed or those scattered through the bladder during resection of the growth. Radium applied to the site of operation following resection delays healing and has occasionally caused sloughing of the tissues with serious results; this should be done cautiously if at all.

Epithelioma of the bladder.—Broders has studied a large number of epitheliomas and classified them according to the degree of malignancy. The extent of the malignancy varies inversely with the degree of differentiation of the malignant cells, or the degree of approximation to the normal cell type. Tumors composed of cells which have structural characteristics similar to the surrounding normal cells are generally of a low degree of malignancy. Malignant papillomas of the bladder which have a cell structure and definition often approximating that of the surface of the bladder, are generally of a much lower degree of malignancy than the structureless masses of irregular cells found in solid epitheliomas. These tumors are graded on a basis of 1 to 4, 4 being the most malignant; the majority of malignant papillomas fall in Grades 1 and 2; the solid epitheliomas and carcinomas in Grades 3 and 4. This is of distinctive prognostic importance, as the immediate operative mortality and the percentage of recurrence vary directly with the grade of malignancy. Scholl has recently reported

from the Clinic a number of cases of squamous-cell epitheliomas of the bladder, stating that in spite of their high degree of differentiation they are extremely malignant and rapidly fatal.

Caudal anesthesia.—The methods of regional anesthesia introduced by Labat are of value to urology from a surgical as well as clinical standpoint. The so-called caudal anesthesia recently described by Scholl, is now employed at the Mayo Clinic for cystoscopy in all cases of intolerant bladders. Such anesthesia has been employed in the Clinic in several hundred cases in which extensive manipulation has been necessary, such as fulguration, litholapaxy, dilatation of strictures of the urethra, and the insertion of radium needles into the prostate without any serious consequences and the relief from suffering which it has afforded has made the procedure well worth while. Owing to refinement of technic there is no difficulty in inducing the anesthesia with the patient on the cystoscopic table, and without much delay.

Pyleographic mediums.—Doubtless most of you are familiar with the advances that have been made in the use of pyleographic mediums. Sodium bromid, suggested by Weld, has proved to be very satisfactory. It seems to cause less irritation than some of the other mediums, it is not toxic, and the resulting shadow is as dense as any other.

Decompression of the bladder.—The effect on the kidneys of the sudden emptying of a distended bladder has been widely discussed. The principle involved is of the greatest importance in cases of distended bladders resulting from prostatic obstruction. It has been claimed by some observers that uremia and death which may occur following the sudden emptying of the distended bladder is explained by the resulting congestion of the kidneys. It was claimed that such congestion might be obviated if the bladder were emptied gradually in order to give the kidneys a chance to regain the normal balance of urinary pressure. This theory has, however, been denied emphatically by others. It has been our experience that the sudden complete drainage of the bladder by suprapubic drainage or by insertion of a urethral catheter was accompanied by a high mortality rate. Withdrawing but part of the bladder contents or replacing the urine which was drained by boric acid solution, did not always overcome the serious results. Van Zwalenburg, in a recent article, described a rather ingenious device

which permits gradual decompression of the bladder. We have applied this method, as described by Foulds, in about 100 cases, with one death. It is remarkable how well the gradual complete emptying of the bladder was borne by the patients. Scarcely any injurious results have been noted, and practically all of the patients have shown evidence of restoration of renal function. The technic is as follows:

"The patient is placed in a hospital and made comfortable in a warm bed. A soft rubber catheter is introduced into the bladder with all aseptic precautions and fastened in place without permitting the escape of urine. This procedure is possible except in occasional cases in which the catheter must be passed on a metal guide. In these cases a minimal loss of urine occurs, usually from 10 to 15 c.c. The catheter is then connected to a six-foot rubber tube which is connected at its distal end with one arm of a Y glass tube. The other arm of the Y tube is hooked over the edge of a receptacle hung at the foot of the bed. When all is connected the clamp is removed from the catheter and the height of the urine receptacle is adjusted to a level at which the urine will just trickle over into it on deep inspiration. The tube is clamped when the patient is fed and bathed, or when any movement is to be undertaken which will disturb the relative level of the bladder and the outlet. The receptacle is lowered 2.5 cm. each day until the bladder has emptied itself or until the level of the outlet is approximately that of the bladder. When this level is reached the bladder is usually almost, if not quite, empty. However, if 100 or 200 c.c. of urine remain, the intravesical pressure is reduced to nil and there is no danger in completely emptying the bladder."

Renal fluoroscopy².—Renal fluoroscopy at the time of operation for renal stone has proved to be of great practical value. This procedure is an adaptation of the portable army roentgen-ray unit so that it can be employed at the operating table. The surgical treatment of renal lithiasis is often unsatisfactory because of complications: (1) The difficulty of exactly interpreting the roentgenogram, (2) the difficulty of locating the stone in the kidney, (3) the inability to find the stone, and (4) the possibility of fragments of stones breaking off or being loosely connected with the original stone. By employing fluoroscopy of the kidney at the operating table these difficulties, with the embarrassing results of failure, may readily be obviated. The kidney

is brought up out of the wound as far as possible, thus permitting easy fluoroscopy. In about fifty operations in which the method has been tried it has proved to be of considerable practical value. In several instances the stone was not found in the kidney until detected by the fluoroscope. In two instances the fluoroscope demonstrated that a stone clinically diagnosed as intrarenal was extrarenal. In several cases after one or more stones had been removed additional stones were demonstrated.

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TREATMENT OF DUODENAL AND GASTRIC ULCERS*

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Ulcers of the duodenum and stomach are neither exclusively medical nor exclusively surgical. The treatment indicated depends upon the type, size, stage of the development of the ulcer and the presence or absence of complications.

All uncomplicated, acute ulcers and the majority of ulcers recognized at an early stage should be treated medically. The medical treatment, in order to be designated successful, should be followed by complete and permanent cure. The medical treatment in a measure constitutes a therapeutic test of the correctness of the diagnosis, in that uncomplicated ulcers of an appropriate type respond promptly. The medical treatment sorts the ulcers into medical and surgical cases. Medical failures and temporary or incomplete cures obtain in the type of ulcer requiring surgery and when the diagnosis is incomplete or incorrect. The cases designated as being incomplete in the diagnosis are the cases having co-existing lesions in the gall bladder, appendix, pancreas or other organs. Obviously, the patient can not be completely cured until all of the lesions have been eradicated. The complication of an accompanying chronic cholecystitis, cholelithiasis, or appendicitis, makes the ulcer case a surgical one. Cases diagnosed as ulcer and treated medically without success, not infrequently fail to disclose an ulcer at operation. Careful exploration of the abdominal contents will disclose pathological lesions of the gall bladder, appendix, pancreas, liver, spleen, etc. The mimicry of ulcer symptoms by these various lesions is well recognized. Even the x-ray findings of a gall bladder adherent to the duodenum are most confusing. Copious hematemesis in cases of gall bladder, appendix, liver or spleen pathology without lesions in the stomach or duodenum occur. The gastric analysis may be most misleading. Of one hundred cases of ulcer of the duodenum, ulcer of the stomach, carcinoma of the stomach, treated at the University Hospital this past year, twenty per cent of the carcinomata had free hydrochloric, and

had hypoacidity and anacidity.

twenty-eight per cent of the ulcers of the duodenum

Etiology.—In conjunction with other factors, the chief direct cause of ulcer is probably sepsis, a streptococcic hematogenous infection not infrequently causing infection of the gall bladder, appendix, pancreas, kidney and various other lesions, most of which clear up, the ulcer, gall bladder, or appendix, any one, two, or all three remaining permanently damaged. This conception explains the complicated pathologic findings presented in the commonly complicated ulcer cases. The clearing up of all primary and secondary foci of infection is, of course, absolutely essential to success.

Symptomatology.—The uncomplicated ulcer manifests itself by secondary and indirect symptoms, consisting of pyloric spasm, hyperactivity of the pyloric end of the stomach, and in some cases hyperacidity and hypersecretion. The uncomplicated ulcer itself gives no direct symptoms. We must remember in considering our results that the majority of untreated ulcers have remissions and periods of quiescence.

The medical treatment of ulcer usually results in obtaining complete relief of the ulcer symptoms. The internist believes that he has obtained a cure in such a case. Operation on such persons may disclose the presence of an unhealed, active ulcer. This is the class of cases which has recurrence of symptoms. Likewise gastroenterostomy alone upon a surgical type of ulcer gives relief of symptoms in a large percentage of cases, and yet if the patient



Fig. 1. Photomicrograph. Chronic gastric ulcer with final malignant degeneration. Eight year history of periodicity of symptoms, hematemesis, epigastric pain two hours after meals, relieved by the taking of food, alkalies, or by vomiting. Section taken from the base of ulcer shows mass of dense connective tissue diffusely infiltrated with glandular epithelium in nodes, cords and a few in well formed gland formation, and show a moderate number of mitotic figures. The edge of the section shows carcinomatous change. The whole ulcer bearing structure shows diffuse round-cell infiltration.

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be reoperated the ulcer may be found present and active.

The so-called successful treatment of many of these ulcers, particularly the chronic calloused ulcer, has probably consisted in the relief alone of the secondary symptoms, the ulcer itself remaining practically unchanged. True healing of the ulcer and the relief of the secondary symptoms are two different considerations. The real cure of ulcer requires not alone the relief of the symptoms but the healing or eradication of the ulcer. Gastroenterostomy relieves the pyloric spasm, ensures more rapid emptying and mechanically drains the results of the hyperacidity and hypersecretion. The inflow into the stomach from the duodenum of bile, pancreatic juice and Brunner's glands' secretion, in a measure assists in the neutralization of the gastric acids, as a consequence of all of which the ulcer becomes symptomless. This constitutes the surgical application of the same principles of treatment as practiced by the Sippy school, the chemical neutralization of the gastric secretion by the patient's own alkalies, the removal of the hypersecretion when present by the gastroenterostomy drainage, thereby controlling the peptic and corrosive action. Gastroenterostomy reduces the free acids between forty and fifty per cent, and the combined acids thirty to forty per cent.

Surgical treatment of ulcer of the duodenum and stomach.—Pyloric obstruction was the original indication for gastroenterostomy. Scar tissue obstruction usually constitutes a healed ulcer, and gastroenterostomy is eminently satisfactory under these circumstances. Gastroenterostomy still con-



Fig. 2. Photomicrograph. Benign, obstructing pyloric ulcer, treated by excision of the ulcer and the performance of a pyloroplasty to overcome the obstruction. Section shows base and margin of ulcerating gastric tissue. Base shows diffuse round-cell infiltration with slight connective tissue proliferation. Mucosa and submucosa show marked cellular infiltration but no evidence of malignancy.

tinues to be the mainstay in the treatment of gastric and duodenal ulcers requiring surgery. It is particularly indicated in cases of high hyperacidity. The operation is, however, unanatomical and unphysiological and should only be performed under protest. The eradication of a lesion is always a great satisfaction to the surgeon. The healed ulcer, if of considerable size, probably constitutes a *locus minoris resistentiae*, does not enjoy the wonderful resistance of the normal mucous membrane, and is more liable to break down again. The definite percentage of malignant degeneration of gastric ulcers is an additional reason for the resection of this latter lesion. Hemorrhage and perforation, as complications, are likewise nullified by excision. Excision of the calloused ulcer should be combined with gastroenterostomy practically always when operatively feasible. Small calloused ulcers of the duodenum in which marked cicatricial deformity or obstruction is absent may frequently be excised without the performance of gastroenterostomy, particularly in the absence of high hyperacidity. The great majority of duodenal ulcers occur in the first portion of the duodenum, that is, between the pylorus and the entrance of the common duct. Transverse excision of the ulcer and suturing should be performed. Perforation of the ulcer, infolding of the ulcer and simple gastroenterostomy without infolding of the ulcer, are at times followed by a cure, as personally verified by secondary operations for gall-stones, postoperative hernia, and the like. Ulcer of the duodenum or stomach, particularly with low acidity, may at times be appropriately treated by resection and the performance of a plastic closure of the Finney type. The merit of the Finney types of operation has not been properly appreciated. Many gastric ulcers may be appropriately treated by excision alone. Edema and inflammation surrounding an ulcer which is acutely infected, contraindicate excision, under which circumstances the tissues at times will not hold the sutures. This complication can frequently be relieved by adequate preoperative treatment, or be relieved by gastroenterostomy, the excision of the ulcer being performed at a second operation. Close proximity to the common duct or posterior wall location are contraindications to excision. This secondary resection is indicated in some of the "incompletes" following gastroenterostomy. Pylorotomy may be performed when eradication of the ulcer or ulcers is indicated and simple excision would result in too great deformity. It



Fig. 3. Photograph. Benign gastric ulcer, removed by simple excision without the performance of gastroenterostomy.

is one of the, if not the, most satisfactory of gastric operations performed and should be more frequently employed. With greater experience in the simple resection of ulcers an increasing resectibility will be found, and a decreasing performance of gastroenterostomy will follow.

No type of surgical intervention is to be performed upon the stomach or duodenum unless the ulcer can be actually demonstrated at the time of operation. This demonstration may require incision into the duodenum or stomach, but uncomplicated ulcers which can not be palpated are usually medically curable and should never come to the operating table. The introduction of an electrically lighted endoscope (proctoscope) into the stomach and duodenum through a gastrotomy has been of assistance in locating an ulcer. Gastroenterostomy performed in the absence of appropriate indication usually increases the patient's disability and should be taken down. Careful exploration of the abdominal contents in other cases not infrequently discloses lesions of the appendix, gall bladder, etc., requiring attention.

The medical treatment in cases with pyloric obstruction should not be persisted in until atony, dilatation and irreparable damage to the stomach, both on the motor and mechanical sides, occur.

Classification of ulcers:

1. Soft lesion, relatively small, superficial, no deeper than submucosa; absence of surrounding induration; benign clinical course, usually cured by medical treatment.
2. Large size, deep penetration, frequently perforating; marked induration, scar tissue, margin of connective tissue and resultant anemia constitute serious obstacle to healing. Surrounding edema; margin comparable to leg ulcer or sclerosis around bone abscess. Requires resection or eradication with cautery.
3. Small ulcer, localized with scar and readily resectible.
4. Duodenitis, as recently described by Judd. Stippling, congestion, edema, thickening present but no scar; no gross loss of mucous membrane; no crater, but multiple very small ulcerations present and leucocytic infiltration.

Ulcers are not infrequently multiple, though only one be palpable or visible. Ulcers of the duodenum and ulcer of the stomach occasionally co-exist.

Preoperative medical preparation and postoperative medical care are equally important to the surgical intervention of ulcer of the duodenum and stomach, and have been greatly neglected. Thorough preoperative preparation makes possible the primary resection of certain ulcers which would otherwise be non-resectible. Rest is a sovereign remedy and its therapeutic value should be more employed by the surgeon. One of the greatest absurdities of surgical practice is the common one of sending the patient, some several weeks after an operation for ulcer of the duodenum, back to the ranks and habits of the normal individual.

The technical details in various surgical procedures for ulcer, the location and size of the stoma, suture materials, the separate and accurate suturing of the mucous membrane layer, the avoidance of the postoperative gastric deformity, etc., are all of paramount importance. Scrupulous attention to the minutest details is absolutely essential to success. The medical and surgical treatment of ulcer in their appropriate fields neither yield one hundred per cent cures, but better results are being obtained in both fields. Perfection is the exception in this world.

The present distrust on the part of the surgeons and internists is due to the fact that each group is seeing more of one another's failures than of the successes. The medical failures go to the surgeon, and the operative failures to the internist; the successes in both fields go to neither. This truth absolutely unbalances so-called statistics. The treatment of ulcer of the duodenum and stomach calls for the very closest and sympathetic co-operation,

not competition, of the medical practitioner and surgeon, each of whom should be thoroughly familiar with the indications and limitations of both fields.

DISCUSSION ON THE PAPER OF DR. A. C. STRACHAUER

DR. VERNE C. HUNT, Rochester: We are very much indebted to Doctor Strachauer for his excellent presentation of the subject of treatment of duodenal and gastric ulcer. I would like to emphasize a few of the points he has made. Incomplete relief obtained in some cases by surgical treatment is often due to an inadequate operation. We often see, at the operating table, not only a lesion of the stomach or duodenum, but associated with it a lesion of the gall-bladder or appendix. Simply to take care of the ulcer by some surgical method, excision, gastroenterostomy or pyloroplasty, without the removal of the diseased gall-bladder or appendix, will not afford the patient complete relief.

Another source of failure is the operative procedure on the stomach, chiefly gastroenterostomy, in the absence of any lesion of the stomach or duodenum. In these cases there have been a great many failures, and gastroenterostomies have been performed and undone; however, such cases, in the absence of ulcer, should not discredit the surgical treatment of actual ulcers. As Doctor Strachauer stated, the good surgical results neither go back to the surgeon nor to the internist; it is only the surgical failures that return for further consideration.

In the treatment of gastric and duodenal ulcers we must distinguish between the medical and surgical ulcer. The medical ulcer, or mucous membrane lesion, is usually amenable to medical treatment, while callous ulcer of the stomach or duodenum is a surgical lesion.

There are many surgical procedures in the treatment of duodenal and gastric ulcers, and the question of the type of operation depends on the type of ulcer, its location, etc. There are quite definite indications for excision. Ulcers of the stomach, whenever possible, should be excised on account of the frequency of hemorrhage and the potential malignancy of ulcers on the gastric side of the pylorus. Balfour reviewed something over 800 cases of gastric ulcers two years ago, and in 25 per cent of these there was a history of gross hemorrhage before operation. Chiefly because of the large percentage of hemorrhage, it is a distinct indication for excision. In duodenal ulcers, potential malignancy does not exist. However, here again hemorrhage, which occurs in 20 per cent of cases, is a distinct indication for excision when possible. Balfour showed that gastroenterostomy alone in bleeding duodenal ulcers did not always control the bleeding from the ulcer.

Another type of duodenal ulcer in which excision is particularly indicated is the one in which the acids of the stomach are normal. In these some type of pyloroplasty may be done, and good results obtained without gastroenterostomy.

Taking the cases of duodenal and gastric ulcers as a whole, it seems to me the operation of gastroenterostomy is probably the one uniformly applicable to most lesions along with excision of all gastric ulcers and all bleeding duodenal ulcers.

To obtain the best results in the treatment of gastric and

duodenal ulcers requires the co-operation of the internist and surgeon, for probably few ulcers are wholly surgical or wholly medical.

DR. ARCHIBALD MACLAREN, St. Paul: I congratulate the association on having heard Dr. Strachauer's interesting paper and Dr. Hunt's excellent discussion. I jotted down several things to which he has referred. Many of our early cases of gastroenterostomy were often made worse because they never had ulcer and ought not to have had a gastroenterostomy in the first place; and such patients are never relieved until their twisted intestinal canals are straightened out again.

Dr. Strachauer touched upon the point of acute perforation. I had seen quite a number of acute perforations before Deaver took the stand that we always ought to combine gastroenterostomy with closure of the acute perforated ulcer. Before Dr. Deaver's first article on this subject was published I had already had quite a number that got perfectly well and stayed well for a number of years. Consequently I have never been able to follow Deaver in that regard, although he has continued to hold the position that the gastroenterostomy should be combined with the closure of an acute perforated ulcer.

The modern x-ray has recently helped me very much in the diagnosis of chronic gastric and duodenal ulcer; it did not help much for a long time. I could not interpret these x-rays, so I had to take the word of the roentgenologist that he could see the ulcer. But rather recently I have seen several. They are usually of the long standing chronic type, the kind that the medical cure does not help. You can quiet these ulcers down for a time but they soon relapse. One patient with a large callous ulcer, with a history of nine years' standing, had had six medical cures. Relief came with great irregularity. But as soon as there was the slightest indiscretion in diet, back would come all the old symptoms. There is absolutely no sense in subjecting these people to additional cures. Their cases are purely surgical and they can only get permanently well by a surgical cure.

DR. J. W. ANDREWS, Mankato: I have to look back only a few years to the time when, in any medical society where internists and surgeons were gathered together, discussions upon this very subject were frequent. First, surgeons took the position that all ulcers of the stomach or duodenum required operative treatment; that these cases belonged to the surgeon. The internist would claim that he could cure all by medical management. Now I think a happy medium has been reached.

I was much pleased with the paper of the evening coming from a surgeon who says that some of these cases are surgical and some of them are medical. If there is an ulcer in the pyloric end of the stomach, hugging closely up to the pylorus, if it is not cicatricial it is very likely to become so, and if cicatricial it is likely to produce obstruction because of that cicatrix. The case then is certainly obstructive and should be operated on. We very often get obstructions.

Let me say that the duodenum will not tolerate strong acid food thrown into it, and so on. If the stomach is very strongly acid, when the bolus of food comes near the pyloric end, nature throws it back and will continue to throw it back; consequently we have an obstruction, but not necessarily an obstruction requiring gastroenterostomy. Gastro-

enterostomy will only afford temporary relief, and such a case is purely medical and should be treated medically.

Some years ago I operated on a number of cases of ulcer of the stomach and duodenum by gastroenterostomy, and I was pleased with my results. I thought I was having splendid success, but I found after some months or a year or so the patients returned with the same symptoms; then I naturally asked myself the question after I had done this operation, why it was I was getting patients from eminent surgeons who had performed gastroenterostomies on patients and in whom the symptoms had returned. I finally came to the conclusion, after treating a good many of them medically, that the average ulcer in the majority of cases, duodenal or gastric, can be cured with medicine and should not go to the surgeon. It is not always true that we have a strong acidity of the stomach. I have seen several cases of ulcers of the stomach in which there was hypoacidity. I have had several ulcers of the stomach and duodenum where the acid condition of the stomach was normal, so that a test meal and a chemical analysis of the test meal is not so reliable after all. But we now have means, I think, of diagnosing in the majority of cases the presence of duodenal or stomach ulcer by the fluoroscope and the barium meal. If we rely upon symptoms we are often misled.

One of my colleagues in the last year has been doing splendid work in duodenal drainage—Dr. Lloyd, of this city, and we have found that where there were symptoms of ulcer there was a streptococcal condition in the gall-bladder or the liver, or duodenum at any rate, and the drainage material upon examination was found to contain many streptococci and other germs which we found were causing the distress and tenderness especially in the region of the duodenum. The first thing then of importance is to make a correct diagnosis, so that we will not be making holes in the stomach in some of these patients who do not have a stomach or duodenal ulcer; and then I am thoroughly convinced that the Sippy treatment carefully followed up will effect a cure. We sometimes make mistakes in prescribing for our patients and allowing them to go around about their business. We will never cure duodenal or stomach ulcer in that way. I believe it is just as necessary to put the patient to bed for a stomach or duodenal ulcer as it is for the treatment of a broken leg. I rarely consent to undertake the treatment of any of these ulcers without first having it understood with the patient that he must go to a hospital or to his home and remain there until I am ready to say that he may be discharged. I have been very much pleased not alone with my own treatment, but with the success of this method of treatment by my colleagues and other physicians.

DR. A. C. STRACHAUER, Minneapolis (closing): I want to thank Drs. Hunt, MacLaren and Andrews for their dis-

cussions. I do not believe that Dr. Andrews could have correctly understood what I said regarding acids and secretory analysis. Perhaps some of the rest of you did not, and with your permission I will re-read that one paragraph. (Reading from paper.)

"Of 100 cases of ulcer of the duodenum, ulcer of the stomach, and carcinoma of the stomach treated at the University Hospital the past year, 20 per cent of the carcinoma cases had free hydrochloric acid; of 28 ulcers of the duodenum the patients had hypoacidity and anacidity, and not all had hyperacidity."

The cure of the callous ulcer is just as difficult to accomplish as the cure of a leg ulcer. Also, following the conservative healing of these leg ulcers, we all have had experience with the ease with which they break down again. I believe that some of the healed gastric ulcers also break down again in certain cases from a lowering of the local resistance of the healed-over area which does not enjoy the wonderful immunity to the irritation of the gastric contents.

I want to emphasize the importance of excision of ulcer. It is always a satisfaction to have the ulcer in a bottle rather than in the patient's stomach or duodenum.

As to the principle of prophylaxis regarding the possibility of malignant development in a gastric ulcer, malignant degeneration of gastric ulcer is a fact and not a theory. The resectibility of ulcers increases with the experience one has in resecting them. It is comparable in experience to myomectomy; the more you do, the more you are able to do.

The Finney operation does not alone overcome the obstruction, but in properly selected cases by proper and prolonged and adequate preoperative preparation it provides opportunity for the excision of the ulcer as a part of the same incision.

Regarding disability following a too wide excision of gastric ulcers, with a remaining distal portion of the pyloric end that does not properly function, pyloric resection removes the ulcer, removes the possibility of malignant degeneration and results in one of the most satisfactory functioning procedures that is practiced on the stomach.

DR. ANDREWS: In these cases of malignancy have you found hyperacidity of the stomach?

DR. STRACHAUER: Yes, we find hyperacidity in carcinoma of the stomach.

DR. ANDREWS: Do you find in the same patients that obstructive symptoms will cause hyperacidity?

DR. STRACHAUER: In a general way most of these carcinomata of the stomach were associated with obstruction, but not always. In some of the carcinomata with hyperacidity the stomach emptied over-rapidly. There was no obstruction whatever, but some of them did have obstruction with hyperacidity.

COMMON CONDITIONS SIMULATING PULMONARY TUBERCULOSIS*

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My reason for presenting this subject today is, that I believe a more serious effort should be put forth to differentiate between the tuberculous and the non-tuberculous, for manifest reasons. Tuberculosis is both over-diagnosed and under-diagnosed.

Fishberg¹ makes the following statement: "Fifty per cent of patients in one of our largest municipal sanitariums have negative sputum. That this is an indication that many are non-tuberculous will be agreed to by every one who has had any experience with tuberculosis. With the anti-formin method of sputum examination, at most ten per cent of active cases are found not expectorating bacilli." J. A. Miller² says: "In my service at Bellevue Hospital as high as twenty per cent of the cases admitted for treatment are not tuberculous." In December, 1915, after a little more than a year of war, Professor Landouzy announced that 86,000 men had been discharged from the French army on account of tuberculosis. Later, after a careful study, Major Rist³ announced that only one-fifth of these men had tuberculosis.

In this country during the war thousands of soldiers were sent to the various tuberculosis hospitals, who did not have the disease. And the fact that the diagnosis had once been made is today costing the federal government much money annually. Ash⁴ found 11.6 per cent non-tuberculous in 198 necropsies at the Boston Consumptive Hospital. At the Montefiore Home County Sanitarium, Stivelman,⁵ in a study of 1,700 consecutive cases, states that 176 were found to be non-tuberculous. He makes the following instructive and interesting statement: "At our sanitarium an unrivaled opportunity presented itself to check the diagnoses of general practitioners as well as specialists in tuberculosis, because it is only on the strength of a positive diagnosis, corroborated by at least one specialist, that patients are admitted."

Major Rist³ says that if such mistakes were exceptional it would be more or less excusable to think lightly of them. But they are far from being exceptional,—even in Germany, where, as you well know,

no man ever made a faulty diagnosis. Whether, as Meissen of Germany says, the fear of being regarded as a poor diagnostician leads to the making of the diagnosis of tuberculosis, on uncertain and slight indications; or whether, as Frankel states, too great value is placed on relatively insignificant findings; or whether the error is due to an incorrect interpretation of the findings, or simply a lack of careful and painstaking study of the case, I am not sure; but I believe in the majority of cases it is the latter.

There are many common conditions which simulate tuberculosis, both from the symptoms and physical signs, and a few will be considered under the following heads:

1. Those with few or no physical signs revealing themselves, but in which the history and symptoms are most suggestive.
2. Those with definite physical signs.
3. Influenza.
4. Gas (warfare).

I. THOSE WITH FEW PHYSICAL SIGNS

Focal Infections: I put focal infections first because I believe that the most common conditions mistaken for tuberculosis are the focal infections of the upper respiratory tract. We might as well examine the stomach *only* of a patient with gastrointestinal symptoms, as to examine the lungs *only* of a patient with disease of the respiratory tract.

Of 1,000 men diagnosed as tuberculous, Kindberg and Delherm⁶ found 193 only to be actually tuberculous, while 113 had chronic nose and throat conditions. A later report may show a larger number tuberculous, as it has been my experience in some of the ex-soldiers who had originally been diagnosed as tuberculous, then later as non-tuberculous.

These patients present themselves usually on account of a cough, general debility and loss of weight. The cause for the cough is often sought for solely in the lungs, yet the chronic nasal conditions—namely, chronic ethmoiditis, maxillary sinusitis, adenoids, deflected septum, hypertrophied turbinates, diseased tonsils—all may have one common symptom—coughing. Every cough must be accounted for.

These conditions are frequent in children, and the pediatricists have been the first to realize the relation. These cases, if recognized and treated by the nose and throat specialist, will readily be cured and the cough will subside.

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While these nasal conditions constitute the largest group of focal infection, still the "suspect" must be thoroughly examined for any other possible foci of infection, such as teeth, gastro-intestinal tract, gall-bladder, appendix, pelvic organs and genito-urinary tract.

Hyperthyroidism: The cases of hyperthyroidism comprise another large and interesting group. There is a train of symptoms familiar to you all and common to both diseases. These symptoms are: malaise, fatigue, loss of weight, tachycardia, nervousness, cough, sweating and elevation of temperature. Many cases of hyperthyroidism have been diagnosed and treated for long periods of time for tuberculosis. Goetsch,⁷ believes that the adrenalin test is of much value. He states that over a period of three years the use of this test in hyperthyroidism, which was later confirmed by operation and microscopic study of the gland tissue removed, has convinced him of the reliability of the adrenalin hypersensitive test. He⁸ claims that many cases of hyperthyroidism have undergone rigid anti-tuberculosis therapy over many years to no avail. Also that there is a group of cases in which there is a demonstrable tuberculous lesion which does not improve under anti-tuberculous therapy but in which there is also present a definite hyperthyroidism. He has published some encouraging reports, and comes to the conclusion that in a considerable number of border-line cases presenting symptoms more or less characteristic both of tuberculosis and hyperthyroidism, he can now pick out those suffering with hyperthyroidism.

On the other hand, Boas⁹ comes to the following conclusion: "The epinephrin test is of no value in the differential diagnosis of doubtful cases of tuberculosis and hyperthyroidism. First, it is not a specific test for the latter condition, but betokens only a heightened sympathetic irritability. It may be positive in frank cases of tuberculosis. Second, symptoms of hyperthyroidism, including goiter and eye signs, occur in a certain number of cases of early tuberculosis, and may possibly represent a defense reaction of the organism to the infection."

Also Webb, Gilbert and Ryder¹⁰ have come to the following conclusion: "It seems more probable to us that this increase in the size and the function of the thyroid is a phase in the marshaling of the body's defensive forces against the invading disease."

Asthenia and Neurasthenia: It is not necessary

to describe the symptoms that these patients present. There are, according to Dercum,¹¹ two principal symptoms in neurasthenia,—nervous weakness and nervous irritability; and when examined carefully, these patients will be found to present motor, sensory, psychic and somatic symptoms.

A hidden tuberculosis may be the cause in both instances, and the nervous symptoms develop from toxins which develop in the focus of infection. In many children tubercle toxins injure the nervous system, destroying the nerve balance, and, through this, interfere with proper physical development. This harmful influence on the nervous system is often carried on for a prolonged period before frank clinical tuberculosis develops. It is often difficult to tell whether the nervous condition or the tuberculosis existed first.¹² Prolonged and careful observation is very necessary in this group of cases.

Anemia: The various anemias and leukemias frequently simulate tuberculosis. The languor, extreme debility, shortness of breath, irregular temperature and cardio-vascular symptoms make up the clinical picture. It must be borne in mind that tuberculosis often develops in primary anemia, and also that a secondary anemia, due to tuberculosis, may closely simulate chlorosis.¹³

Gastric Ulcer: Were it always easy to differentiate between hemoptysis and hematemesis, there would be little difficulty as a rule. Blood may be aspirated and coughed up; also it may be swallowed and vomited. Blood will appear in the stool in either case. An important point to remember is, that if the patient continues to expectorate blood-streaked sputum after the initial hemorrhage, the blood comes from the lungs.

The writer recently saw a case of carcinoma of the cecum that very beautifully simulated pulmonary tuberculosis.

Fevers (Typhoid and Malaria): When the usual clinical picture of these fevers is present, there is not much chance for error in diagnosis. A fever of pulmonary tuberculosis with obscure chest findings is more apt to be called typhoid. This is an unnecessary mistake.

Septic Endocarditis: This condition is frequently overlooked. There may be an indefinite febrile attack, with no positive heart sign, and not until the condition causes an embolism in the brain, spleen or kidney is the nature of the disease suspected. However, when the murmur is present,

also fever, leucocytosis, enlarged spleen, petechiæ, positive blood culture, the diagnosis is easy.

II. THOSE WITH DEFINITE PHYSICAL SIGNS

Chronic Non-Tuberculous Lung Infection: Under this heading a variety of pathological pneumonic processes have been described. Many of these cases are treated as tuberculosis, and they usually improve or recover.

The infecting organism seems to be the bacillus influenza, streptococcus, staphylococcus and pneumococcus. The cases in this group have been variously named as: subacute or chronic broncho-pneumonia, or peri-bronchitis; lobular form of broncho-pneumonia of long duration.

Miller¹³ says the pathology may consist of a localized bronchitis with a lobular distribution, which may clear up or persist in a subacute form, offering a site predisposed to exacerbations and increased tendency to fibrosis.

These case are extremely chronic, with frequent exacerbations. The physical signs may be insignificant, yet the lung infection be the cause of a long continued fever.

The symptoms vary. The chronic morning cough with expectoration and even hemoptysis makes the diagnosis confusing. The physical signs are usually in the lower lobe. A basal tuberculous lesion is rare, and the patient is always toxic. If the lesion is in the apex, the diagnosis may be extremely difficult, and will require observation.

Chronic Bronchitis and Emphysema: These patients usually give a history of cough with expectoration extending over a long time. The cough is worse in cold and changeable wheather. The sputum may be blood-streaked. The general health of the patients is fairly good, and they do not have the toxic symptoms of tuberculosis. The adventitious sounds are heard all over the lungs, more especially the bases. Resonance is not impaired at the apices. The x-ray does not show the mottling of tuberculosis. The sputum is negative, and it is rare to find a negative sputum in an extensive tuberculosis with profuse expectoration. The tuberculous complications are absent.

However, tuberculosis frequently develops in these cases. Also, some forms of chronic tuberculosis slowly develop an associated emphysema which may be accompanied by bronchitis and asthma. When seen, the underlying tuberculosis may be masked by the other condition and overlooked.

Bronchiectasis: The history of these cases usually dates from an attack of pneumonia, grippe or pleurisy, and may be of long standing. Large quantities of purulent sputum is expectorated periodically. Posture influences the attack. There may be hemorrhage. Some patients may pass many years in a comparatively good general condition, while others may lose weight, become dyspneic and tire easily. As in chronic bronchitis, these patients are apt to have severe attacks in cold and changeable weather.

"The difficulty in diagnosis is increased by the fact that tuberculosis may be accompanied by the expectoration of large quantities of sputum and not show bacilli. Cavities at times suppurate after the bacilli disappear. Also, cases may be free from bacilli for years and be considered as simple bronchitis, and then show bacilli."¹⁴

The areas are usually in the lower and middle lobes and unilateral. There are not the tuberculous complications which might be expected in such extensive involvement. Resonance is influenced by the amount of secretion. If it is located in the upper lobes, resonance is not impaired above the clavicles; in tuberculosis it is. Tuberculosis is contiguous from the apex.

The x-ray and sputum findings are most valuable.

Abscess: There is usually a history of cough beginning after an operation, or a septic pulmonary embolism or pneumonia. Those following pneumonia may be a type of empyema which ruptured spontaneously into a bronchus. Following the pneumonia there may be a slight rise of temperature daily, and empyema may be suspected and unsuccessful explanatory attempts made to localize it. Lung abscess usually occurs in the lower lobes, and there are present the hectic fever, sweating and septic symptoms.

Mitral Disease: There are symptoms common to both mitral disease and pulmonary tuberculosis, such as cough, expectoration, hemoptysis, emaciation and fever; and yet it is rare to find these two diseases co-existing in the same patient, so rare that Fishberg has made the following definite statement: "It has been my rule never to diagnose tuberculosis in one showing signs of disease of the mitral valve and cardiac hypertrophy or dilation, irrespective of physical signs, unless the sputum reveals tubercle bacilli."

Birch-Hirschfield found only three cases of tuber-

culosis in 4,359 autopsies. The frequency of hemoptysis in mitral stenosis is one reason for the difficulty. In a study of 3,456 cases of hemoptysis at the Massachusetts General Hospital by Cabot, 1,723 were found to be due to pulmonary tuberculosis, and 1,177 were due to mitral stenosis.

The murmur in mitral stenosis is variable, difficult at times to elicit and not always present. The cause of hemoptysis in fully compensating hearts is engorgement of the pulmonary circulation and rupture of the blood vessels. In cases of heart failure it is due to infraction or embolism, due to clotting in the auricular appendage during auricular fibrillation.¹⁴

The râles in heart disease are usually in both lungs and at the bases, with clear apices. But they are not always basal and may be found over other parts, even in one or both apices.¹⁵

III. INFLUENZA

Prior to the epidemic of influenza in 1918, patients with a history of cough, fever, loss of weight, etc., together with suggestive physical signs in the chest and also suggestive roentgenographic evidence and with persistently negative sputum, were diagnosed as pulmonary tuberculosis. Since the epidemic we have found that many of these cases are really post-influenzal conditions of the lungs. It must be remembered that influenzal inflammation of the lung may simulate tuberculosis very closely and that time, and time *alone*, will show that the influenzal pathological condition does not remain as does tuberculosis. Repeated examinations of the sputum are absolutely necessary. Sloan reports the questionnaire and summary of answers received from 29 sanitariums (June, 1920). In answer to the question, "In your experience, has the epidemic of influenza increased the number of cases of tuberculosis requiring sanitarium treatment in your section of the country?" twenty-three answered yes, two slightly, two no and two undecided. Of my own cases of tuberculosis I find that 26 per cent date their symptoms from an attack of influenza and were perfectly free according to the history from any known tuberculosis, prior to the epidemic. Influenza is an etiological factor in the reactivation of latent tuberculosis and does "mark the beginning of definite pulmonary tuberculosis."

IV. GAS (WARFARE)

Since the use of gas in the world war, we have encountered a hitherto unknown pathological condition, which demands careful study, namely, gas

poisoning and its effects. Tuberculosis does develop in some of the cases. In my records of 100 consecutive cases of gas poisoning, I have found 12 cases of tuberculosis. This fact must be borne in mind. However, while the symptoms in the chronic cases of gas poisoning are similar to those of tuberculosis, the findings are quite definite and differ from tuberculosis.

The symptoms in chronic cases in order of their frequency are as follows: shortness of breath (especially upon slight exertion and paroxysmal in character), weakness, and early fatigue; cough, with or without expectoration, may be paroxysmal, and occurs at various times during the day or night, or when in close places or upon inhaling dust; pain in various parts of the chest, nausea and vomiting, poor appetite, pain after meals, constipation or diarrhea, loss of weight, hoarseness, tachycardia (which may be paroxysmal), easily irritated eyes, tendency to catch cold easily, perspiration and pleurisy.

The physical examination of cases of gas poisoning will reveal the following: (1) inspection will show diminished expansion, rarely of the entire chest, most frequently of the bases (one or both, more often the right, less frequently the upper region); (2) tactile fremitus may be increased; the respiration is shallow; (3) there may be impaired resonance; percussion may be normal or even hyper-resonant, in some cases reminding one of the emphysema of asthma; (4) inspiration is rough, harsh, and sometimes of the cogwheel type, slightly intense and heard over the entire chest better than normally, providing there is no pleural thickening; in some, expiration is prolonged. Over the bronchial areas themselves the breathing is almost tubular in quality. The râles are scattered, but more prominent in the middle of the chest, not in the extreme apices or bases; they vary in size and usually clear up on coughing. They are not the true subcrepitant or indeterminate râle, and of course are never resonating. When the patient expires, coughs and inspires, the râles do not come at the beginning of inspiration as the tuberculosis râle does, but later on, and extend through inspiration. They resemble the sibilant and sonorous râle.

An x-ray examination of the lungs shows a very definite picture. There is considerable increase in the tissues around the hilus of the lung. The plates show evidence of disseminated inflammation; peribronchial infiltration extending well out into the lung substance, but not as a rule to the periphery.

An intense peribronchial infiltration extends to the bases. The apices are usually clear. There are often localized areas of fibrosis.

The writer has selected only the most frequent conditions which are commonly mistaken for tuberculosis, and in conclusion will say that with more careful and thorough study of our cases, and a conscientious utilization of the roentgen ray and of our laboratories, we will make fewer mistakes in the diagnosis of pulmonary tuberculosis.

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MAXILLARY SINUSITIS OF DENTAL ORIGIN*

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The nasal accessory sinuses have been the subject of much discussion for many years and now, after several centuries, we are still not agreed on many things concerning these sinuses. For instance, it is easy to find authority for the statement that seventy-five per cent of antrum infections are of dental origin and just as easy to get authority for stating that seventy-five per cent are of nasal origin.

It seems very doubtful whether an antrum infection can be set up by the direct invasion of the healthy mucous membrane by micro-organisms. In

health this mucous membrane is protected by its secretion, which is inhibitory toward bacterial growth, as well as by the action of its cilia. When this protection is lost (usually through some extrinsic causes) suppurative inflammation can be caused by direct invasion of the bacteria. [Skillern]

These extrinsic causes of lowered vitality are given by most text books on "Nose and Throat" as two: (1) general disease, usually an infectious one; (2) obstruction to the sinus ostium by swellings, either bacteriological or otherwise in origin. To these I would add (3) dental disease, which may be the primary cause even in the presence of one of the other two.

In the case of an infectious disease such as influenza, the direct connection between it and the local sinus disease has not been clear heretofore. Probably there is a devitalization of the mucous membrane in the sinus due to the influenza which makes it susceptible to infection. I believe some dental disease, such as an abscessed tooth just beneath the antrum, is the most likely source of this secondary infection. It may have acted as a mild irritant over some time and when the mucous membrane is lowered in resistance it sets up the infection. This seems more logical when we consider that the bacteria found in the sinus are usually not the ones causing the general infection. Further, the course of the sinus disease is, in this case, quite independent of the patient's primary disease.

In the presence of some obstruction to the antrum's ostium the mucous membrane of that cavity will change and become less resistant to bacteria. Here again dental disease can be the cause of the actual infection of the sinus. The dental condition may have been so mild that the mucous membrane could resist infection while it was healthy, but with lowered resistance, due to obstruction, it could no longer keep up the battle.

Dental disease, in the two above mentioned conditions, we have considered as being in a contributory rôle. When the dental condition has been present long enough, the infection will creep along the lymphatics of the bone, or the pus itself will come into actual contact with the antral mucosa. Soon this will cause the mucous membrane to become irritable and to be lowered in resistance until it yields to the progressive infection and an antral suppuration is set up. The mucous membrane becomes thickened and gives rise to an abundant purulent secretion which drains into the nose. This the patient interprets as a "cold." Many so-called

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cases of rhinitis are really a primary sinusitis with the nasal symptoms secondary. This type of antrum disease may be acute, subacute, chronic or recurrent.

The type of dental disease which may cause antral infection varies. It is not always the carious tooth, the manifest alveolar abscess, or the apical abscess seen in the x-ray; but areas improperly treated after extraction, retained roots, devitalized teeth with root canal fillings, or partially dead teeth (such as one root dead), may be responsible.

Very careful study of many x-ray films taken at all angles is necessary to discover certain pathological areas. Close co-operation with the dentist is imperative, for his knowledge of the finer anatomical and pathological details is of tremendous value.

Clinically, the antrum of tooth origin has many characteristics, chief of which is its tendency to recur. A recurring maxillary sinusitis is nearly always due to a dental disease. These recurrences are often considered by the patient to be "one cold after another." Sometimes they complain only of "bad catarrh," or of discharge dropping into the throat. Close questioning will perhaps reveal the fact that these colds are one-sided, or that a one-sided purulent nasal discharge persists after the "cold" got well. Sometimes the patient knows that these colds all started following some dentistry. In these days of the exodontist's activity, an unavoidable opening is frequently made into the antrum from the mouth, which often results in an infected antrum, as the antrum is a fertile field for the normal bacterial flora of the mouth.

There are other cases whose chief complaint is photophobia. In New York City Dr. David Webster has a series of such cases. The patient will put on colored glasses and get no relief. Sometimes he will be treated for retinitis and even for lues but gets no relief till the antrum is treated.

In about sixty per cent of our antrum cases, even those not associated with ethmoidal or sphenoidal disease, the blind spot shows enlargement.

The transillumination findings are of great value, especially in recurring antrum infections. By using a small transilluminator, under rheostat control, one antrum will be found to light up better than the other when the lamp is turned low, which difference would not show up with a brighter light. This finding can usually be checked up by the x-ray, which at the same time aids in ruling out such things as cysts or polypi of the antrum, unequal size of the two cavities, or unequal thickness of

their bony walls. This type of antrum is apt to show variation, one day much darker than another. Almost always one will find dental disease below this darker antrum. After careful use of suction or by irrigation, pus is seldom found at this stage, but a mistake is made to conclude the antrum is "negative" because no pus is obtained on irrigation. If the patient is instructed how to watch for any symptoms, especially keeping watch of the nasal discharge from each nostril—he is very apt to return with his own diagnosis of antrum infection made.

By watching the course of an antrum under treatment much information can be obtained, a fact that text books fail to mention. The characteristics of the secretion when irrigated from the antrum are quite definite. A milky or odorous discharge from an acute antrum nearly always means it is due to a dental cause. Pain, tenderness or swelling of the cheek suggests a tooth. Pain in a certain tooth during the irrigation of the antrum puts that tooth under suspicion. An acute antrum which does not get well promptly is usually due to dental disease. An antrum which has recurring attacks of suppuration is nearly always of dental origin. An antrum which is changeable under treatment, that is, nearly well one day and odorous and milky the next, means dental pathology.

After the diagnosis is made, the first step in treating an antrum of the dental type is to remove all dental disease. Without the co-operation of the dentist little can be done. We have repeatedly had dentists give a negative report on the tooth when we felt certain that there was some dental cause present. Realizing the difficulty of diagnosing these minute lesions we have insisted upon further investigation, which has shown some dental pathology, the removal of which has resulted in the cure of the antrum. Not infrequently we have to get the dentist to extract a tooth on OUR responsibility and when he sees the antrum get well he is convinced.

Some illustrative cases follow in brief:

Case No. 290. Miss H. complains of having had a cold for the past few days. She has seen pus coming from each nostril. Her dentist tells her all the devitalized teeth are out. Transillumination shows the right antrum one notch darker than the left. After instruction as to using the nasal suction pump and watching herself for a few days, she came back with her right antrum dark on transillumination and full of milky pus. One tooth was always painful at irrigation and for several hours following. The dentist found this to be a vital tooth, but the milky discharge continued for nearly a month. Finally the dentist removed the filling of this tooth and found one root contained a dead nerve. After extraction of this tooth the antrum promptly cleared up and there have been no recurrences of antrum trouble in the past three years. This is the first case in our

records of an antrum infection being caused by a tooth which was "vital" to tests, yet was partly dead. We now have about fifteen similar cases.

Case No. 1649. Mr. J. is treating for pulmonary tuberculosis. Has seen pus coming from the right nostril for over a year. There is a spot on the right cheek that is very tender, in fact his barber can hardly shave this spot. The right antrum transilluminates black. Irrigation shows milky odorous pus. There is a fistula over the area where the first upper bicuspid was extracted, which drains pus, but a probe will not enter the antrum. X-ray shows pathology here. This area was opened and necrotic bone removed; also a root was found which did not show up in the x-ray. In ten days the antrum was well.

Case No. 1212. Mr. N. for several months has had frequent left-sided colds. These last from two to four days and they are accompanied by pain and swelling of the left cheek. Yellow pus pours out of the left nostril during these attacks. Transillumination shows the left side to be slightly darker than the right. X-ray of the second upper bicuspid shows a large apical abscess. This tooth was extracted and followed by a gush of pus from the antrum. Since then he has had no trouble.

Case No. 828. Mr. B. Following la grippe six years ago there was foul yellow nasal discharge lasting eight months. This has recurred several times since. There have been numerous attacks of bronchitis. Transillumination shows the right antrum to be dark. X-ray shows the upper two bicuspids devitalized. Irrigation shows milky odorous pus. These teeth were extracted and no opening made into the antrum. In twenty-four hours the odor had gone and the pus from the antrum was blood tinged, showing a definite relation between the dental disease and the antrum disease. In one month the antrum was well and has been so ever since.

After seeing many cases clear up so promptly following the removal of the dental disease, it seems natural that if these teeth had been treated earlier the antrum infection could have been prevented. A patient with a suggestive history, transillumination findings typical, and dental disease beneath his antrum has enough to justify a diagnosis of recurring antrum infection. This diagnosis holds good even if there is no pus in the antrum at the time of examination and even if no antrum irrigation is made. The patient can save himself much trouble by having his teeth taken care of at once and not waiting for his antrum to become reinfected. This will be demonstrated when we see his antra transilluminate equally and his frequent colds and nasal discharge cease when his teeth are cared for.

Not every antrum will respond to irrigation after removal of dental cause. A chronic antrum is most resistant, but every antrum should be treated conservatively for as long a time as seems reasonable, probably a month at least. After the most painstaking search for dental pathology and its most

thorough removal, the antrum should be cleaned out daily and the character of the discharge studied. If its odor stops and it stops being milky and the water becomes clear, the progress is favorable. Should no change be noted over a reasonable time, further measures should be instituted.

Of course the ethmoids and frontals should be put in normal condition and nasal breathing space made ample by correcting any obstruction. Mere mention is made of this as this paper is concerned with a different type of antrum infection.

Should operation be necessary, the antrum is best attacked through the nose. It is to be hoped that the days of pulling sound teeth, boring up into the antrum and washing through this hole, are gone. That method was introduced over two hundred years ago and was very popular in spite of the fact that most cases so treated were failures. An opening made from the mouth into the antrum, whether through the alveolus or during a tooth extraction should be closed as soon as possible to avoid constant contamination, and the antrum treated through the nose.

The object of operation is to establish ventilation and drainage and to restore the function of the mucous membrane. This can be done simply and easily by making a large opening through the nasointral wall beneath the inferior turbinate. A portion of the lower turbinate can be safely removed if necessary to allow this opening to be made large enough. After this is done the patient can be taught to keep his own antrum clean until it gets well.

The more radical operations of curetting the antrum and destroying the function of the mucous membrane, are very rarely indicated because a very chronically infected antral mucosa will recover if proper drainage and ventilation is established. A true polypoid condition of this membrane is very rare indeed. In the rare case of bone involvement, the radical operation may be necessary, but the bony walls of the antrum are usually not involved for there is a double blood supply to the floor and nasal wall, one from the antrum itself and one from the mouth and nose. In our office, during the past three years we have not had to perform such an operation a single time.

In conclusion I wish to thank my associate, Dr. E. H. Parker, for the privilege of expressing here many ideas which are originally his and of using much material he has gathered in the course of his large experience in treating maxillary sinusitis.

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HELIO THERAPY*

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When Rollier gave us his method of heliotherapy, he put into our hands an agent for the treatment of surgical tuberculosis which has proven without a doubt to be far superior to any other. Surgical tuberculosis is rarely recognized in its early manifestations, and the patient is fortunate indeed if he accidentally falls into the hands of someone who makes the correct diagnosis.

In the classification of surgical tuberculosis, we may tentatively include all forms of tuberculosis excepting pulmonary, and as we give heliotherapy only to selected cases of pulmonary tuberculosis, depending on the different conditions which manifest themselves, we will deal with only those cases we think suitable for solarization.

All of Rollier's predecessors in sun-therapy were content to make exacting researches and advance science with their findings, paying little, if any, attention to the practical application of their methods. It was left to Rollier, who was sufficiently trained surgically, to put his method of heliotherapy on a firm practical basis and bring his treatment before the medical world. This treatment today is as far ahead of the expectant treatment of plaster casts and splints, as the rest treatment of pulmonary tuberculosis is ahead of the older ideas where fresh air and good food played the important part.

Sunlight is composed of waves of different lengths which, when passed through a prism, are broken up into the colors of the rainbow—red, orange, yellow, green, blue and violet. These rays are known as the visible spectrum and together make up white light. Beyond the red rays are the invisible infra-reds, and beyond the violet rays are the invisible ultra-violet rays. These rays are subdivided into classes, as calorific or heat rays, and to this class belong the infra-red, red and orange rays; the luminous rays, as the yellow and green; the actinic or chemical rays, the violet, blue and ultra-violet rays. The different rays have different penetrating powers and are more effective in high altitudes than in low because of the lessened

density and the increased purity of the air. Light may be either reflected or projected; different conditions, such as the presence of dust, smoke and gases, may arise which will hinder their penetration. Particularly is this true of the ultra-violet, upon which the curative action depends.

The action of light upon the skin is varied. There is little immediate reaction upon the skin while it is exposed to light. Later, usually from six to twenty-four hours after an exposure, the patients feel the sensation of itching, smarting and pain; then the redness appears and all the sensations of a burn manifest themselves. Likewise, the reaction of the skin to the sunlight depends upon the intensity and the duration. At first the skin responds and endeavors to protect itself from a foreign irritation, this irritation being the ultra-violet ray. For it is due to this ray that sunburn is produced, and not to the red rays as is commonly supposed. Naturally the skin's response to this irritation is the formation of a pigment, by producing at first a dilation of the superficial capillaries and blood vessels with a resultant erythema. Following the erythema, a pigment is produced in the skin. This pigment deposit becomes greater in intensity and the skin takes on a bronze hue, then a copper color, and finally a chocolate brown.

The sun conveys a feeling of warmth throughout the body, warms the blood passing through the heated fields, and produces a dilation of the superficial capillaries and blood vessels. It stimulates the lymph streams, produces a general perspiration, increases general metabolism and stimulates the sudoriferous and sebaceous glands. There is a general increase in red cells of the blood and a decrease in leucocytes. The dilation of the vessels becomes permanent and the different layers of the skin thickened.

The skin, which at first is pale, anemic, and moist, takes on a nice, firm texture; it becomes dry and velvety to the touch and appears healthy. All this action is due to the calorific or heat rays. These rays produce tanning, which is the protective coat against the ultra-violet rays, so that the deeper the tan, the more protection afforded; and the deeper the penetration, the greater benefit obtained.

Certain precautions must be observed in the carrying out of the treatment, as heliotherapy, when improperly applied, may be dangerous and very injurious. It means a great deal more than turning a patient out into the sun indiscriminately.

Heliotherapy may be used for other conditions

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besides tuberculosis, such as puerperal sepsis, secondary anemias, dermatitis, cellulitis, rickets and selected cases of pulmonary tuberculosis. There are certain difficulties and dangers which manifest themselves, and the treatment, although simple, may become very dangerous in inexperienced and careless hands.

Surgical tuberculosis has always been looked upon as a local condition, and the aim of surgeons and orthopedists have been to cure up a local condition, little attention being paid to the general bodily condition, while in fact it is a general condition with local manifestations. Therefore, the general condition must be taken into consideration before attempting any surgery.

In the first place, it is well to ascertain the location of the focus of infection. A great percentage of cases never had a physical examination made of their chests. If this had been done, advanced pulmonary tuberculosis would have been found in a great many cases to have been the primary lesion, and no operation would have been attempted. A great many patients with positive sputum and active pulmonary tuberculosis have been subjected to the ordeal of an operation with anesthesia.

Rollier has an operating room in his clinic, but uses it as a court of last resort, preferring to cure cases without resorting to operation. He refers to plaster casts and splints as both an orthopedic and a physiological nonsense, as they deprive the body of both air and sun, particularly those regions of the body most in need of them. The sooner we realize that this form of tuberculosis must be treated as a general disease where resistance plays an important part, the sooner are we going to obtain results from these almost hopeless cases.

In giving sun cure at Glen Lake, we have followed Rollier's technique as closely as conditions will permit, and I will briefly describe our method of treatment.

Before starting a patient with the treatment, he is at first put into isolation, to determine whether he is free from a contagious disease. During this time, the blood, sputum and urinary findings are closely observed, and his temperature, pulse and respiration are carefully noted. This takes about one week, and in the meanwhile the patient has had an opportunity to become acclimated. By this time he is accustomed to the action of the light and air, having spent practically the entire time in the open.

Febrile cases must be watched very closely and

in these cases the time of exposure must be gauged according to the way the patient reacts to the treatment. The treatment is carried out in bed, on a couch, on a bench constructed for the purpose, or even on the floor.

No sun is given later than one-half hour before a meal, and not sooner than an hour after a meal. During the hot summer months it is well not to give the sun during the heat of the middle of the day, as it is very depressing and devitalizing and causes nausea, headache and temperature.

If a wind is blowing, every precaution must be taken to guard against a breeze striking the patient. A movable screen about five feet high can be placed in such a position as to warrant protection. This is absolutely necessary in the fall, winter and early spring. Although the patients are able to endure a great deal of cold, the slightest breeze will cool the body and will produce a chill which is liable to be the exciting factor in producing pneumonia.

The head is protected from the direct rays of the sun by means of a linen cap, sunbonnet, or awning at the head of the bed.

The eyes are protected by means of colored glasses. This is to ward off the intense sunlight, which will produce symptoms of eye strain, and also cause a muscal volitantes after the patient is taken out of the sun.

The muscal volitantes at first is very slight and transitory, but later becomes more or less uncomfortable. This condition, although transitory, is accompanied by headache, dizziness and derangements of digestion. This can easily be avoided by colored glasses.

The following schedule is followed by us in giving sun-cure:

The body is divided into zones, as feet, legs, thighs, abdomen, chest and neck.

First Day: The patients are clothed in either their pajamas or nightgowns. Their head and eyes are protected from the sun by means of a sun shade or glasses. The feet are exposed first without regard to the site of the lesion. The lesions are kept covered with a gauze or wire screen until the whole body has been gradually exposed. The feet are exposed as far as the ankles and insolated for five minutes. This is done anteriorly and posteriorly. There are four insolations given at not less than hour intervals.

Second Day: The feet are insolated for five minutes. At the end of five minutes the legs are

DR. ROLLIER'S SCHEMATIC DIAGRAM OF INSOLATION

| DAYS | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th | |
|------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--|
| | | | | | | | | | | | |
| | | | | | 5 Min. | 10 Min. | 15 Min. | 20 Min. | 25 Min. | 30 Min. | From the 10th to the 15th day, increase according to the same scale. |
| | | | | 5 Min. | 10 Min. | 15 Min. | 20 Min. | 25 Min. | 30 Min. | 35 Min. | From the 15th day, all the previously exposed portions of the body should receive the same amount of insolation as the longest exposed part,—increasing the time 5 minutes daily, till a bath of from 3 to 4 hours is taken. |
| | | | 5 Min. | 10 Min. | 15 Min. | 20 Min. | 25 Min. | 30 Min. | 35 Min. | 40 Min. | |
| | | 5 Min. | 10 Min. | 15 Min. | 20 Min. | 25 Min. | 30 Min. | 35 Min. | 40 Min. | 45 Min. | |
| | 5 Min. | 10 Min. | 15 Min. | 20 Min. | 25 Min. | 30 Min. | 35 Min. | 40 Min. | 45 Min. | 50 Min. | |

THE PROGRESSION BY WHICH THE PATIENT IS EXPOSED TO THE SUN

insolated for five minutes as far as the knees, thereby giving the feet ten minutes of insolation and the legs five minutes. This is done anteriorly and posteriorly four times, at hour intervals.

Third Day: The feet are insolated for five minutes. At the end of five minutes the legs are insolated as far as the knees. At the end of ten minutes the thighs are insolated as far as the hips, thereby giving the feet fifteen minutes, the legs ten minutes and the thighs five minutes. This is done anteriorly and posteriorly, once in the morning and once in the afternoon.

Fourth Day: The exposure is extended another five minutes up to the next zone, also the abdomen as far as the chest is insolated. This gives the feet twenty minutes, legs fifteen minutes, thighs ten minutes, abdomen five minutes of sun, and of course the posterior part of the body is also insolated.

Fifth Day: The next zone, or the chest, is insolated the same way, increasing five minutes each day. The insulations are increased five minutes each day until the patient is able to take three hours of sun daily: one and one-half hours in the forenoon and one and one-half hours in afternoon. We never give more than a two-hour exposure at one time. While the entire body is being insolated a loin cloth is the only garment the patient wears.

Occasionally, on account of severe pains or flexions of a limb, or other conditions, it is impossible

to roll the patient over and give sun on the back. It is well just to give solar radiations on the anterior part of the body and then, just as soon as the condition permits, give solar radiations on the posterior part. This can be done in about ten days or two weeks.

Sinuses or ulcers are not exposed until after the whole body has been insolated and then are given additional radiation by means of the Thézac Porsmeur lens, a description of which will be given later.

Precaution must be exercised, while the patient is becoming accustomed to the sun, and during the formation of the hyperemia, that no burn or any reaction occurs, for it is at this stage that the greatest damage can be done. If, for any reason such as burn, high temperature, acceleration of pulse, nausea, emesis, headache, or any other constitutional disturbances, it is necessary to discontinue the sun bath for a few days, the insulations must be started again a few steps back from where they were discontinued.

Blondes or red-haired individuals, where the blood vessels are superficial and where the pigment deposit in the skin is scant, are inclined to burn instead of tan. These cases are put on a diet of carrots and spinach to produce a carotenemia and a deposit of pigment in the skin. This enables blondes to develop a deep pigmentation, the degree

of which is an index to the progress the patient is making. The deeper the tan, the more favorable the case, and the sooner the recovery.

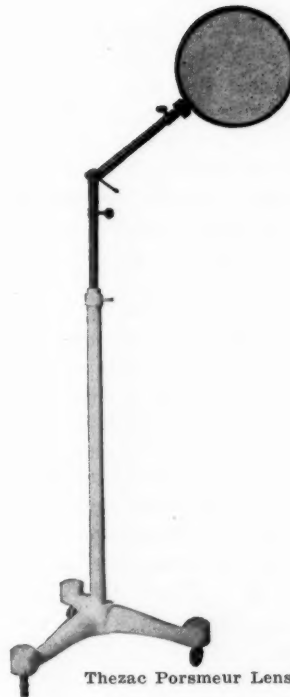
Patients, upon entering the hospital, are often thin, emaciated, cadaverous-looking, fever-ridden, anemic and almost dead with pain. They are afraid to have one lean against the bed, the slightest jar causing excruciating pain. These cases begin to improve in about ten days. The pain is relieved, chills and fever subside, and from an unhappy, sickly individual, we obtain a smiling, happy, contented patient.

Temperature is not a contra-indication to sun cure. As I stated, sun cure may prove dangerous if used indiscriminately. It has practically the same effect as tuberculin and produces the symptoms of such, and the tuberculin-like reaction may be of indefinite severity and duration.

Proper treatment increases the appetite, induces restful sleep and the return of strength, stops chills and night sweats, and increases the general metabolism. It acts as an alterative and reconstructant. It raises the temperature of the body, reduces blood pressure and relieves pain.

For deep-seated lesions, indolent ulcers, sinuses, localized pain, and sluggish wounds, we are using the Thézac Porsmeur lens. It was first introduced into this country by Mrs. Edward C. Post of New Port, and used in her sanatorium at Porsmeur Morlaix, Brittany, in the treatment of sluggish wounds among the soldiers. It is a biconvex lens with a diameter of 12 inches and a focal point of 72 inches. The lens is focused over the site of the lesion so as to obtain a circle of light seven inches in diameter. Less than seven inches, the heat from the circle is too hot to be comfortably borne by the patient, and greater than eight inches it is not efficacious. If the sun is very hot, the circle is made larger, and if the sun is poor, a smaller circle of light is used. The treatment is started at five minutes and increased five minutes each day until thirty minutes are being given, and then a treatment of thirty minutes is given morning and afternoon. Sluggish wounds which would not heal begin to take on a healthy aspect and granulation forms. Ulcers, sinuses and fistulas heal over and pain is relieved almost miraculously.

Great care must be exercised in handling the lens. At its focal point it burns anything combustible almost immediately. Special attention must be exercised in keeping colored materials away from the zone of light while a patient is taking



Thezac Porsmeur Lens

the lens treatment. White is the least combustible of all colors. It allows all of the sun rays to pass through it and offers the least resistance to the rays, thereby absorbing little heat. Under the direct rays of the sun, at the lens focal point, white cloth will burn in ten seconds, whereas colored cloth will burn instantaneously.

Indoors, where the sun enters through a pane of glass or through screening, colored material burns just as quickly as outside, while white cloth will not burn at all, proving thereby that sunbaths are not as efficacious when taken through glass or wire screening. On cloudy days, when we are unable to give sun cure, we give a general air bath. This acts as a general tonic and stimulant. We also use the Mercury Quartz Vapor Lamp. This lamp has been used as a substitute for the sun on cloudy days, and in winter, for so long a time that it now is an accepted adjunct to the treatment.

The following technique has been used by us in lamp treatment: Instead of zoning the body and increasing by five-minute periods, we give general body radiations for one minute, increasing one minute each day until fifteen minutes are given. We then increase by five minutes instead of one minute until thirty minutes are taken. The lamp is thirty inches from the body. By using precau-

tion in this, burns can be prevented. Later, after a patient has become well tanned, we can proceed more boldly and shorten the distance of the lamp from the body by successive steps to fifteen inches. When it is necessary to substitute the lamp for the sun during the course of the treatment, one minute of lamp is given for every five minutes of sun. The distance of the lamp depends upon the tanning of the body. The lamp treatment is just as injurious to the eyes as sun treatment and the same precautions must be used in both.

A physician is seldom consulted during the early stages of tuberculosis. It is only when definite symptoms manifest themselves that advice is sought, and then usually only after the rounds of "advertising specialists" have been made.

Pain is an almost constant symptom. It is usually dull, boring and continuous in character, and in children and adolescence often referred. It is rarely necessary to resort to opiates for the relief of pain, as sun cure accomplishes this in about ten days.

When it is necessary to remove the pus in abscess cases, it should be done by means of aspirations alone, never operating directly into the abscess, but a short distance from it, passing the needle first through healthy tissue, then into the abscess cavity. Sealing the cavity when withdrawing the needle prevents the possibility of the abscess rupturing and a mixed infection resulting.

Sun cure and air are foods. Both sun and air are bracing, invigorating and stimulating. Rest is an important factor. The part that is affected must be put to rest in favorable position. This is secured by putting the patient in bed. An affected joint should be placed in the most favorable position consistent with the comfort of the patient, at the same time taking care to overcome deformity and muscular contraction. Take, for instance, a case of tuberculous hip; the affected limb is raised from the bed and placed on a board at such a height that the spine lies on the bed in its normal contour. Weight extension is applied by means of circular leather cuffs, three inches wide, gripping the thigh fast above the knee and the leg just above the ankle; a pad of cotton and gauze is placed between the cuff and limb to protect the skin; straps on each side of the leg join the knee and ankle cuffs. Enough weight is applied to relieve muscle spasm. As the muscle spasm is relieved the limb is lowered by successive steps, so as to bring it flat on the bed, at the same time

maintaining the normal arch of the spine. The weight extension is applied to the long axis of the body. Care must be exercised that this is not improperly applied, because, if so, interosseous pressure may be increased and pain and deformity result. In lowering the limb, place the hand under the lumbar spines, and when you feel them just leaving the hand, that is the proper position to maintain.

Shoulder, elbow and wrist cases are treated in the same manner.

The amount of weight applied varies with each case. A safe rule to go by is to add one-half pound to each year of the person's age up to twenty years. After twenty years, usually ten pounds of weight is sufficient.

In a case of knee, the same idea is carried out, except that the pull is from the knee instead of from the hip. The leg is put at an angle of about 90° with the thigh, and supported by a board. As pain is relieved and muscle spasm is overcome, the leg is gradually straightened out.

In spine cases where there is a kyphosis, the patient is at first taught to lie upon his abdomen and support his body by means of his forearms locked underneath his chest. After the forearms become accustomed to carrying the weight of the body, a large triangular pillow, 18x20, is placed underneath the chest. The small end of the pillow is in a line with the center of the kyphosis. This produces a compensatory lordosis and allows the anterior bodies of the vertebrae to separate and produces a widening of the intervertebral disc. By widening the intervertebral discs the bodies are freed from each other and pain is relieved. It also allows, by producing a compensatory lordosis, the bodies of the vertebrae to assume a normal contour and overcome the deformity. In a great many cases, on account of the number of vertebrae involved and the extent of the deformity, several pillows must be used. The patient remains in this position the entire twenty-four hours and he is allowed to lie on his back only when it becomes necessary.

After the patient has been resting on his elbows for twenty-four hours a day for some time, he is turned on his back to see whether the kyphosis can support the weight of the body without pain. If this causes pain, he is again turned on his abdomen and the treatment is continued as before for a while longer. As soon as he is able to lie on his back for twenty-four hours, the kyphosis

resting on a mattress, supported by a board frame, without pain, a sawdust pillow, 10x15x4 inches thick is placed underneath the kyphosis. This continues the attempt of correction of the kyphosis by increasing the production of the lordosis. This is allowed to remain until it can be comfortably borne by the patient, and then a board of the same dimensions is used in its place. This remains in place until the patient is allowed up, *i. e.*, until the patient is apparently arrested—in all, usually about three years.

In those cases where there are pressure symptoms, weight extension is applied.

It is very important to know when tuberculous disease has been arrested in a joint case. When pain and muscular spasms have been overcome and swelling has subsided, the traction may be removed. If the disease is still active, muscular spasm will return.

Classification of Results: The results obtained in surgical tuberculosis have been temporarily classified at the J. N. Adam Memorial Hospital at Perysburg, New York, as Arrested, Improved and Apparently Recovered.

As it is the aim of the National Tuberculosis Association to standardize terms and nomenclature in order to simplify things, I would suggest that the same terms used in the classification of pulmonary cases be used in surgical cases, modified in such a manner as would be fitting in the cases under consideration, such as the following:

Apparently Cured: All constitutional symptoms with all sinuses closed and physical signs to be those of a healed lesion for a period of two years under ordinary conditions of life.

Arrested Case: All constitutional symptoms with all sinuses closed and physical signs to be those of a healed lesion for a period of six months.

Apparently Arrested: All constitutional symptoms with all sinuses closed and physical signs to be those of a healed lesion for a period of three months.

Quiescent: Absence of all constitutional symptoms. Sinuses may or may not be discharging, the physical signs showing the disease to be stationary or retrogressive, the foregoing condition to have existed for at least two months.

Improved: Constitutional symptoms lessened or entirely absent. Physical signs improved or unchanged, sinuses usually discharging.

Unimproved: All essential symptoms and signs unabated or increased.

COMPLICATIONS FOLLOWING SURGERY OF THE GALL BLADDER AND BILE DUCTS

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During the last decade, owing to the better understanding of the pathology and the more refined technique in surgery of the upper abdomen, one would expect to find fewer complications following surgery of this region. This undoubtedly holds true to a large extent, and, in reviewing the literature, one is struck by the absence of reports on complications following operations on the gall bladder and ducts; nevertheless, they must occur more often than one is led to believe. Lack of knowledge of the normal anatomy, failure to recognize the anomalies of the blood vessels and ducts, hurried or incomplete operation together with poor exposure, may account for the greater portion of surgical accidents.

I shall only attempt to discuss the immediate complications attending surgery of the biliary system and not consider those others, such as acute dilatation of the stomach, general peritonitis, embolism and wound hernia, as these may also follow other abdominal procedures.

One of the immediate complications is hemorrhage, more marked in the cases of severe jaundice where there is a slow coagulation time and a tendency for all surfaces to ooze. Where jaundice is present preceding operation, the liability of hemorrhage should be foreseen and, if possible, steps taken to decrease the clotting time.

Dr. W. J. Mayo in 1911 said, "Hemorrhage sometimes occurs during the period of jaundice—oozing of blood at first from the wound, and, later, general bleeding of the purpuric type. Various remedies have been advised as preparatory treatment of this condition, such as chloride of calcium, thyroid extract, and numerous other agents. We have tried them faithfully but have not been able to see any benefits from their use. After hemorrhage has begun, the subcutaneous use of alien or human blood serum has been strongly recommended, but it has not the specific effect that, for example, it has in the hemorrhage of the newborn; and in a few cases in which we have used it, the benefits derived were doubtful. Transfusions help to lower the clotting time, but even these fail in the severe cases to stop the bleeding."

Nothing new was added until Bell and Walters

of the Mayo Clinic recently concluded that transfusion should be used only in cases of marked anemia and is a dangerous procedure in the very septic and jaundiced because of the effect of the "protein reaction" upon the kidneys. They further state that 50 per cent of patients with pre-operative jaundice who died following operation, died as a result of intra-abdominal hemorrhage. It seemed that death from hemorrhage is dependent on a coagulation time of more than ten minutes, and a marked degree of jaundice. They were able to reduce the coagulation time in several cases by daily intravenous injections of calcium lactate (5 c.c. of 10 per cent solution in redistilled water) and at the same time giving calcium by mouth and glucose proctoclysis. They attempt to reduce the amount of circulating bile pigment by a large fluid intake and excessive elimination.

Bleeding from the raw surface of the liver in cases of cholecystectomy is usually not serious and is readily controlled by stitching over the raw area or, if necessary, placing fat or, better, transplanting a piece of rectus muscle in the gall bladder bed and holding it in place by one or two sutures. Packing with gauze is to be avoided unless other methods fail, except in cases of acute empyema where cholecystectomy leaves a large raw bleeding surface. Here one should not use sutures owing to the possibility of carrying infection into the liver, causing liver abscess and pyemia.

The cystic artery passes behind and not along the side of the cystic duct, and is shorter and closer to the liver. It occasionally happens that artery is cut before it is grasped or that it slips from the forceps. Also, one must bear in mind the possibility of an anomalous artery which may be severed before it is clamped. In any case, bleeding is very marked and great care must be exercised in grasping the artery so as not to injure the ducts. Mayo says that the artery "retracts into a pocket in Calot's triangle, and the forefinger, properly placed, will check the bleeding at once. A few mouse-toothed forceps can be caught in the tissues about the forefinger, forming a little basket, and by lifting on the forceps the finger can be removed and the artery caught with exactitude." Judd's method of exposing and catching the cystic duct and artery, separating them from the liver, usually obviates the danger of injury to the common or hepatic ducts and allows one to easily tie the artery.

Bleeding from the cystic artery after the patient has returned to bed is most dangerous and the

symptoms of internal hemorrhage are soon manifest which, unless recognized and controlled at once, will surely lead to a fatal termination. The blood usually will not drain along the established tract and appear on the dressing, but will be retained, masking, to a certain extent, the diagnosis.

Injuries to the portal vein are rare, but have occurred, and require immediate attention and very delicate technique for their repair. Its lumen must be kept open.

Fistulae following operations upon either the gall bladder or ducts are either mucous, biliary or mixed in type. Balfour and Ross state that "because of the margin of error always present in surgery of the gall bladder and ducts, the numerous and varied factors which contribute to an inadequate original operation and the unknown incidence of stone reformation, it is doubtful whether total elimination of post-operative fistulae can be attained." Mucous fistula is seen only after cholecystostomy and is due to a failure to remove the stone which was impacted in the cystic duct. Occasionally, it may result from the scar contraction following ulceration due to prolonged lodgment of a stone in the duct. Removal of the cause results in quick closure of the fistula.

Biliary fistula may follow most any type of operation, but is usually due to a failure to remove all stones either in the common duct or gall bladder, or to injury to the ducts; it may open and close intermittently. Too low a division of the cystic duct in doing a cholecystectomy may rarely be a factor; chronic pancreatitis, which produces pressure on the common duct, may be a cause at times, but a fistula due to the latter will close, as the drainage will cure the pancreatitis. Cancer of the common duct will also cause persistent biliary fistula. These patients with a permanent bile discharge are very apt to lose their appetite and in time become quite emaciated unless a substitute for the bile is administered.

In the mixed type, pancreatic juice is discharged with the bile, and digestion of the skin and wound edges is likely to occur in spite of the precautions taken to protect these surfaces. Obstruction in the ampulla below the opening of the duct of Wirsung is necessary for the establishment of this type.

Fistulae from the gastro-intestinal tract are sometimes met in cases where the gall bladder was ulcerating into the stomach or bowel and after removal of the former the necrotic wall of the viscus gave way with a fistula resulting a day or two after

operation. The most serious is the duodenal fistula, which discharge causes digestion of the tissues. In the past these have often proved fatal, but of late good results have been reported from the use of x-ray, which has caused more rapid healing of the fistula. Beck's paste, thickened with one to two-thirds paraffin, injected three or four times daily, is said to be of value.

Perhaps the most annoying of complications—and the ones that will cause the prolonged suffering of the patient—are injuries to the common and hepatic ducts. These accidents are usually due to poor exposure and a failure to properly identify the various structures in that region before clamping or cutting them. They are usually not recognized at the time of operation but only after pain, jaundice or biliary fistula have appeared. Pain is a prominent symptom where the common duct has been ligated, and is felt along the costal margin, under the scapula and in the right shoulder. This is noticed before the jaundice has appeared and, like jaundice, disappears when the fistula is formed. Lesser injuries may result from a pinching or kinking of the duct, leading to the formation of scar tissue and stricture. Operations for repair of the common duct are very difficult even in the hands of the most expert technicians and serious because the patients are usually in poor condition when they consent to secondary operations. Numerous efforts have been made to graft fascia, inverted veins, and other tissue; but all have proven unsatisfactory, on account of their inability to withstand the irritating effect of bile, and the late cicatricial contraction and obliteration of the lumen. According to Horsley, only tissues should be used that have a biologic resistance to the normal contents of the duct or viscera to be repaired. The "T" tube has been used with success in selected cases, and Sullivan's principle of burying a rubber tube in both ends of the ducts or into the duodenum and surrounding it with neighboring tissues is one of the best methods to date.

The diagnosis of stricture of the duct offers a difficult problem at times; there may be a persistent or intermittent fistula. Jaundice of varying degree is present if the fistula tends to obliterate. Pain under the ribs and right shoulder when the fistula closes indicate back pressure, and is always relieved by the re-establishment of the drainage. Where the stricture is slight and no fistula is present, the other symptoms are also only moderate and may render the diagnosis exceedingly difficult;

stone in the common duct and malignancy will have to be ruled out. If opportunity for observation of the patient for a short period can be obtained, the differential diagnosis can usually be made.

Biliary peritonitis is due to the escape of bile into the general peritoneal cavity. It is seen very occasionally where the ligature has slipped off from the cystic duct either before or after the drain has been removed, and the bile not following along the drainage tract is retained in the peritoneal cavity. It is more apt to occur where there is a low lying liver that seals the incision, preventing escape of the drainage. It is this occasional complication that sometime may happen when the abdomen is closed without drainage in cases of cholecystectomy. Too short a division of the cystic duct—not allowing sufficient room for a good ligature—allows a little pressure to force the ligature off and let the bile escape. If the bile is sterile there is very little reaction at first and quite a large amount may collect before a diagnosis is made. These cases usually have nausea, vomiting, and distention with dullness in the flanks as the amount of bile increases. Icterus appears from the absorption of the bile pigments but is not intense (rather a yellowish tinge), and the urine will give the characteristic test for bile. If not diagnosed, these cases may go for some time before they prove fatal. A recent case seen in consultation had a cholecystectomy a month previous and the patient had become quite emaciated and had a tremendous distention of the abdomen. An incision evacuated over 8,000 c.c. of bile. The temperature in this case had been almost normal up to about three days before I saw her, at which time it rose about a degree and a half. If, however, the bile is infected at the time it leaks into the peritoneal cavity, we at once have the picture of the septic peritonitis plus the signs of absorption of bile.

Subdiaphragmatic abscess is a rare complication. Judd, in 1915, reported only seven cases associated with gall bladder operations. It is always a most serious condition and is accompanied by a high mortality, even though it is recognized and drained. It is more apt to follow operations where there is considerable pus with insufficient drainage established, allowing direct infection or soiling. It should be watched for in every septic case, because only early diagnosis and evacuation will allow the patient a chance for recovery. The portable x-ray should prove of value in diagnosing such a case.

Lockwood recently described the operative technique using the paravertebral anesthesia, which allows more extensive operations to be performed with much less risk.

Some adhesions in the region of the gall bladder and ducts are practically universal, but usually cause no difficulty unless the pyloric end of the stomach or the small bowel, especially the duodenum, becomes adherent, causing partial and very rarely a complete obstruction. This can easily be avoided, as Dr. C. H. Mayo says, "by forming your own adhesions," which is done by bringing up the great omentum and placing it in between the liver and the other structures, according to the method of Wyllis Andrews, thus walling off the dangerous raw surface. Wounds, tender a long time after healing, may be due to adhesions at the point of drainage, and may be greatly relieved by the use of hot applications and massage. Adhesions are also said to occasionally cause kinking of the ducts with resulting colic; this condition, however, must be extremely rare.

The older method of stitching the gall bladder to the abdominal wall in case of drainage is now obsolete; but these patients are occasionally seen with symptoms of pain and tenderness and pulling or dragging sensation, which is remedied by secondary operation.

Keen says that "post-operative neurosis should be sharply differentiated from mechanical interference from adhesions." Patients in this group complain of painful dragging in the region of the scar and other unrelieved symptoms. These cases are not benefited by reoperation and are sometimes seen having several scars. They are a most unsatisfactory type of case to handle, but some are benefited by an abdominal support, where the x-ray shows marked ptosis.

A review of our cases done since January, 1916, for diseases of the gall bladder and ducts, prompted this paper. In this series there were no cases of serious hemorrhage; two had biliary fistula, one due to stricture and the other to an overlooked stone in the common duct; one had biliary peritonitis coming on after removal of the drain at the end of a week. One case of subphrenic abscess following acute empyema of the gall bladder, also complicated by pneumonia, in spite of the multiple complications, made a complete recovery except for a wound hernia.

CONCLUSIONS

1. A knowledge of the normal anatomy of the

hepatic system is absolutely necessary before attempting surgery of that region.

2. A thorough understanding of the possible pathology and the various surgical procedures and their consequences is essential.

3. Poor exposure and "working in the dark," so to speak, begets a higher percentage of complications and poorer results.

4. Early recognition of the complications and immediate action shortens the period of convalescence, and lowers mortality.

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DISCUSSION ON THE PAPER OF DR. W. C. CARROLL

Dr. W. E. SISTRUNK, Rochester: Doctor Carroll has prepared for us a very interesting paper and has considered

almost every complication that may follow operations on the gall-bladder and ducts.

His suggestions as to the pre-operative care of badly jaundiced patients are very good. We operate on no patients with greater reluctance than those who are badly jaundiced, and the mortality is as high in that group as in any patients that come to us for operation. I believe the most common complications which follow cholecystectomy are probably secondary hemorrhage from the cystic artery or injury to the common duct, and I will confine my remarks entirely to those two complications.

Some years ago Doctor Judd suggested a method of performing a cholecystectomy which we have found extremely useful and I believe it has been almost universally accepted in the Mayo Clinic.

(The operation demonstrated with slides.)

We have to think always of the common duct in doing a cholecystectomy. I think injuries to the common duct often occur through an effort to get beyond a stone which is lodged in the cystic duct or through efforts to control hemorrhage which has occurred from the cystic artery.

(Means of trying to avoid such accidents demonstrated with slides.)

DR. GEORGE G. EITEL, Minneapolis: The essayist has thoroughly covered all the important points regarding the complications that are liable to follow operations of the gall-bladder and bile ducts and, therefore, there is nothing for me to add, except to approve of what was said.

In going over this subject, I am, however, reminded of my early experience in surgery in this part of the anatomy with a case which I would like to briefly relate: A man, aged 58, gave a history of having suffered many attacks of gall-stone colic usually followed by jaundice. His last attack was the severest and he became very yellow. Waiting until the temperature and jaundice had subsided, he was operated. The gall-bladder being considerably distended with fluid and stones, a cholecystostomy was made, a drainage tube inserted into the gall-bladder and the latter fastened into the abdominal wall incision. About forty hours after the operation, hemorrhage to the extent of saturating the dressing took place; the drainage tube was promptly removed and the gall-bladder cavity firmly packed with iodoform gauze. In this way the hemorrhage was completely checked for about eighteen hours; the gauze was then removed and the cavity again packed as before, which again controlled the bleeding for less time than before, when the patient had another severe hemorrhage and died. The post-mortem examination revealed that the bleeding came only from the mucous membrane of the gall-bladder, there being no evidence of hemorrhage from other parts of the body. I resolved, should I ever again meet with a similar case, that I would at once open the abdominal wound and place a strong curved clamp at the lowest point of the gall-bladder and leave it there long enough; place gauze into the gall-bladder as well as around the outside of it, also bringing the omentum up to the incision and leave the abdominal wall wound well open, in this way guarding against infection which might take place, especially should the gall-bladder become gangrenous, which should be expected.

Cholecystectomy in my judgment should never be done in cases where the coagulation time of the blood is not satis-

factory, otherwise dangerous oozing from the raw liver surface may take place. Cholecystostomy with the minimum amount of traumatism would seem to be the safer course.

Mucous fistulae are produced by infection, and impaction of a stone at the juncture of the gall-bladder and cystic duct, producing ulceration and finally cicatricial contraction and obliteration of the lumen. On opening the gall-bladder in these cases, no bile, but mucus instead, is found. If only cholecystostomy is done, a fistula discharging mucus will follow, and the only remedy is cholecystectomy. If the patient is in suitable condition, cholecystectomy should be done at once; if not in good condition, one should be content for the time being with cholecystostomy, as it takes a shorter time and considerably less trauma is produced.

Biliary fistulae are generally produced by the surgeon who by mistake ligates the cystic duct too low, or perchance ligates, crushes or even cuts the common duct itself. This has happened to some of the most distinguished surgeons ever since operations on this part of the body have been undertaken.

In dealing with adhesions in the bile duct region, it behooves the surgeon to be exceedingly circumspect in order not to injure structures here so closely related. Obstruction of the common bile duct sometimes follows many years after the removal of stone. I should like to briefly cite the case of a woman who had suffered a number of years from gall-stone disease. The operation disclosed a contracted gall-bladder filled with a stone. One good sized stone was also lodged in the common duct and in all probability had been there a long time. It was easily removed through a longitudinal incision in the duct which was closed with fine silk. The patient made an uneventful recovery and for over sixteen years enjoyed very good health. Finally, she became gradually jaundiced without suffering the least bit of pain. An exploratory operation was made and a completely obliterated common bile duct was encountered. The patient died about two months later.

BLASTOMYCOSIS: CLINICAL PATHOLOGY AND THERAPEUSIS*

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When Ricketts,¹ in 1901, gave us our first thorough study of a series of cases, blastomycosis was regarded as a disease peculiar to Chicago and its vicinity. It is true that sporadic cases of disease due to yeast-like organisms had been described elsewhere, notably by Busse² in Germany and Gilchrist³ at Johns Hopkins, yet Chicago and its vicinity was the only locality in which the disease was commonly recognized. Time has shown, however, that blastomycosis is no more a Chicago disease than is appendicitis an American disease;

*Presented before the Minnesota State Medical Association, Duluth, August, 1921.

both are world-wide in distribution and probably have been for centuries. It is occasionally recognized not only in all sections of the United States but also in Canada, British Isles, France, Germany, Italy, India, Japan, China and Africa.

Time has not only broadened our knowledge of the geographic distribution of blastomycosis, but has enabled us to learn that the cutaneous form of the disease, so-called blastomycetic dermatitis, is the least formidable of the aspects which the disease may assume. It was early recognized that the cutaneous manifestations may be followed after intervals, sometimes of many years, by pulmonary and general involvement; and also, that general involvement may precede the appearance of cutaneous disease. In other words, a systemic form of blastomycosis has been differentiated and has been found to equal the cutaneous form in incidence and to excel it by far in the gravity of its prognosis. Five years ago, Wade and Bel⁴ of New Orleans advocated the recognition of a third type of blastomycosis on the following grounds: When the blastomycetic infection is limited to an extremity or to the superficial tissues elsewhere, the condition can often be ameliorated and perhaps cured by surgical interference aided by proper medication. "We would direct attention to the much used analogy in tuberculosis, which infection may be cutaneous, as lupus vulgaris, systemic, usually via the pulmonary tissue, or a deep-seated tuberculosis in which generalization of the infection may be avoided by proper measures." Cases of blastomycosis conforming to this picture, Wade and Bel classify as cases of surgical blastomycosis rather than as generalized or systemic.

The lesions of blastomycosis are all characterized by the presence of the specific organism, usually in abundance. The organisms are easily demonstrated by mixing a drop of pus with potassium hydrate on a glass slide and examining unstained, microscopically. The fungi are recognized as circular or oval budding bodies 15 to 30 micra in diameter with a clear, doubly contoured membrane.

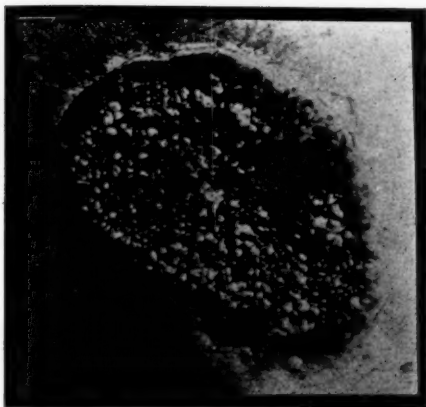
The gross characteristics of blastomycetic dermatitis are constant and pathognomonic. The first finding on the part of the patient, in all cases, is a sluggish, red papule or pustule. If there has been a preceding traumatism he may observe that either the wound does not heal or that apparent healing occurs, the papule or pustule not appearing for several days or weeks later. The primary

papule ordinarily becomes pustular in a short time, and the apex of the pustule transformed into a crust which, when removed, is found to cover an irregular, elevated, reddened base, which secretes a small amount of glary muco-pus; a narrow red areola appears early. Extension takes place steadily so that, in from two to four or six months, the lesion has a diameter of one to two inches. In the meantime the rough granular condition of the base becomes greatly exaggerated and gradually a coarse papillomatous or villiform surface results, the processes of which are separated by deep, irregular clefts, which are filled with pus. In the fully developed lesion the appearance sometimes is decidedly cauliflower-like, the verrucous tissue rising precipitously above and overhanging the surrounding skin. In other cases the papillomatous tissue is more flattened and shows little of the cauliflower appearance; this is always the case in the process of healing.

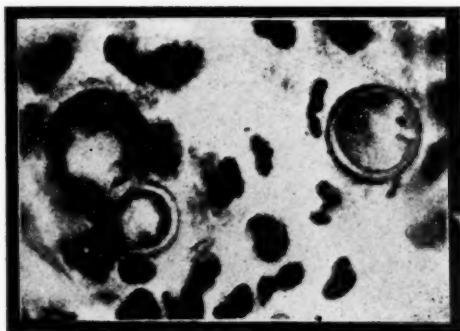
The skin immediately surrounding the verrucous tissue forms a characteristic areola. In the most extreme condition it is red or bluish red, tumid, and rises somewhat to meet the base of the ulcer, possesses an unbroken horny layer and is studded with sub- or intraepithelial abscesses 1 to 1.5 millimeters in diameter. On being pricked they yield a droplet of sticky, glary pus in which the organisms are easily demonstrated. The degree in which these findings are present varies in different cases and in the same case at different times.

When the lesion has covered an area of two inches or perhaps less, the center loses in part, or even completely, its papillomatous surface, becomes depressed below the level of the surrounding tissues, and either appears red, moist and granulating, or it may be dry and show cicatricial healing. In the early stages of cicatrization, it is not uncommon to find scattered miliary abscesses, containing a few fungus cells, in the cicatrix itself even when the verrucous tissue has largely disappeared. Study of sections shows that organisms may remain embedded in the deeper granulation tissue long after healing has been well started. This fact seems to explain the recurrence of the disease when, supposing cure to have been established, the patient ceases medication.¹ A particular focus may heal entirely with no treatment.

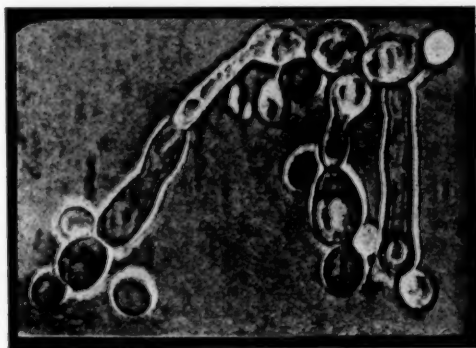
Extension of the disease is accompanied by a direct invasion of the contiguous skin; in most cases there are periods of rapid progression interrupted by periods of relative quiet. There is a



(1) Cutaneous blastomycosis—from a lesion about an inch in diameter. Note the verrucous nature of the lesion, raised above the surrounding skin with a narrow sloping margin. Characteristic millary abscesses appear in this margin from which blastomyces laden pus may be obtained to clinch the diagnosis. Areas of this type have been mistaken for tuberculosis and for epithelioma. They differ from tuberculosis in their more rapid growth and more rapid healing; the verrucous processes are larger, softer and more succulent, and the abscess-studded areola characteristic of blastomycosis is absent in tuberculosis. These same features serve to differentiate epithelioma.



(2) Smear from pus from blastomycetic abscess. Note the relative size of the fungus, the clear, doubly contoured membrane, and the characteristic budding form. This is the only form of growth assumed by blastomyces in the tissues.



(3) Beginning mycelial formation in cultures. The organisms never appear in this form in the tissues, but in cultures, by varying the media and temperature conditions, mycelial growth may easily be produced. The forms shown here may be said to represent a stage midway between the budding and the mycelial organism.



(4) Section from case of blastomycetic dermatitis. Note the marked epithelial overgrowth with active inflammatory reaction in the cutis. The characteristic intraepithelial abscesses, bordered by partially cornified epithelium, are well shown. This picture is typical and different from that found in any other disease.

marked disposition to creep gradually from the point of origin to rather distant areas as in the case of Gilchrist and Stokes,¹ where the disease began as a papule over the left mastoid process, whence it encircled the left ear, invaded the left cheek, chin, palpebral and supraorbital skin, successively, then the bridge of the nose and finally similar points on the right side of the face, the older areas cicatrizing as the borders advanced.

In the cases of blastomycosis beginning as blastomycetic dermatitis, generalization of the infection is quite common (perhaps 50%); but there are no signs of general disturbance such as fever, headache, nausea or pathologic changes in the

urine. Systemic blastomycosis presents a far different picture. At first the patient feels rather run down, there develops daily fever quite irregular in type, emaciation steadily increases in degree with marked loss of weight and the patient begins to cough; shortly after that he develops abscesses that are both cutaneous and sub-cutaneous. The cutaneous abscesses break down into superficial, ill-kept, discharging ulcers. Abscesses in the deeper tissues also become manifest, some reaching large size and rupturing spontaneously. The great majority of cases result fatally. At autopsy, the characteristic lesions are the abscesses with blastomyces-laden pus. These lesions have been described

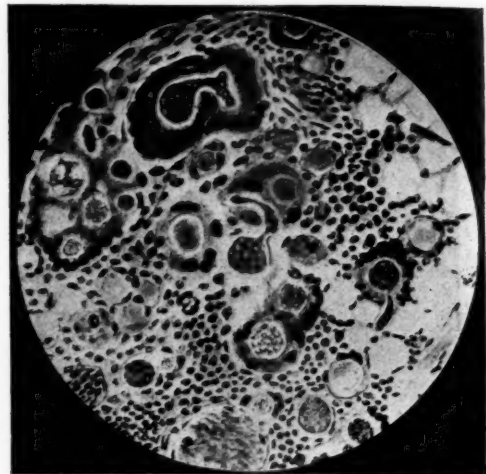


(5) A few years ago we carried on an investigation of the immunological reactions of blastomycosis.⁵ During that study we were able to follow the process of phagocytosis *in vivo*. This slide is from a smear of the peritoneal exudate of a guinea-pig two hours after the intraperitoneal injection of a suspension of blastomyces. Note how the large phagocytic cells are streaming toward and coalescing about a group of organisms. As the hours pass, these masses become larger and more compact; as the liquid part of the exudate is absorbed they become attached to the peritoneum, are gradually covered over by it and in a few days sections through such nodules will demonstrate the plasmodial mass of leucocytes as a typical foreign body giant cell enclosing blastomyces.

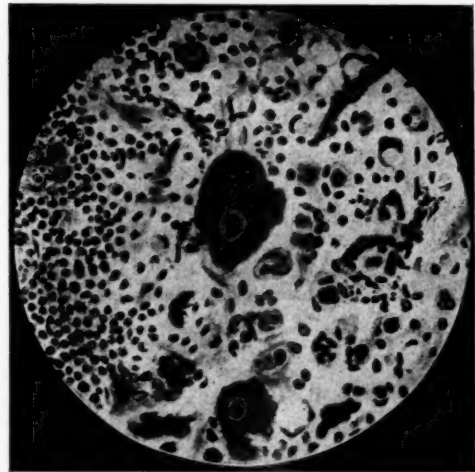
in almost every tissue of the body, including the bones, spleen, kidneys, lymphatic nodes, prostate and brain. In twenty-seven cases discussed by Wade and Bel, there were 169 organ foci, averaging 6.25 organs per case, many organs, of course, containing multiple foci.

In surgical blastomycosis we have deep-seated lesions—subcutaneous, muscular, or of bones or joints, single or multiple, while the lungs and other viscera escape involvement. The infection is confined to a part or parts in such a manner as often to be amenable to surgical treatment in conjunction with other measures. Extension, when it occurs, is either direct or by way of the lymphatic channels.

The microscopic pathology of blastomycosis is characterized in all cases by the presence of the specific organism and, in most, by nothing else. Only in blastomycetic dermatitis is the microscopic pathology characterized by additional findings; here the picture is constant and peculiar. At first glance one is struck by the marked epithelial overgrowth—the cell masses infiltrating the deeper layers of the skin in striking resemblance to epitheliomata. In these cell masses we note small abscesses surrounded by partially cornified epithelial cells and containing, in variable proportions, giant cells (multinuclear and of the foreign body type),



(6) Section from the omentum of a guinea-pig ten days after intraperitoneal injection of a suspension of blastomyces. Note the phagocytic cells, many of the foreign body giant cell type. This nodule, though subperitoneal, is the direct development from a rosette such as that shown on the preceding plate.



(7) Subperitoneal nodule from the liver of the same guinea-pig from which the preceding section was obtained. It shows the invasion of the liver substance by the inflammatory growth and the same giant cell formation. In animals which recover, such nodules become fibrous and disappear in from three to six weeks; in other cases they enlarge, soften, and multiple abscesses may be produced. Organisms may retain recognizable form in tissues for weeks after apparent healing has occurred and have been successfully cultivated on artificial media after a month's apparent quiescent residence in guinea-pig tissue. This is in accord with Rickett's description¹ of normally staining organisms in the scars of healed areas of blastomycetic dermatitis and is again suggestive of a reason for the chronicity of cases of blastomycosis and the occasional flaring up of the process after apparent cure. These slides also suggest the intense cellular reaction against blastomyces which seems to be the chief active mode of defense of the body against blastomycetic infection.

plasma cells, polymorphonuclear leucocytes, epithelial cells showing more or less cornification, endothelial-like cells, tissue debris and blastomyces (sometimes free, at other times imprisoned in giant cells or phagocytic cells of other types). One also finds abscesses containing blastomyces beneath the epithelium but the peculiar, characteristic finding is the intraepithelial abscess.

Recovery in blastomycosis appears to depend largely on the phagocytic and proliferative activity of the tissue cells.⁶ Antibodies are developed in the blood slowly and in relatively small amounts. Both experimental and clinical data suggest that healing of blastomycotic lesions is more the result of phagocytosis and imprisonment of organisms by fibrous tissue than of the interaction of any other factors.

In the treatment of any form of blastomycosis certain general measures are worthy of consideration. As in the tuberculous, fresh air, rest and good food are of prime importance; this is especially true of the generalized cases. Certain drugs have been found of benefit. Potassium iodide by mouth in large doses has for years been routine in certain clinics with good results. Salvarsan, intravenously, has given marked benefit in some cases, while from South America come reports of the efficiency of tartar emetic given intravenously.⁶ Vaccination has not had a thorough trial. Stober was hopeful from the results in one case of generalized blastomycosis, although the case was lost track of before cure was established. From the experimental side, a low grade of immunity has been established in animals by vaccination with an extract of the blastomyces, and recovery seems to have been hastened. The results thus far clinically have been inconclusive.

In cases of cutaneous blastomycosis, in addition to general measures, clean surgical excision is a logical procedure when the lesion is so situated that serious mutilation will not be thus produced. The curette should never be used on the lesions of cutaneous blastomycosis; its use has been followed by rapid generalization of the infection in at least one case. When surgical interference is permitted it should take the form of wide, clean excision. When surgery is contraindicated, good results may usually be expected to follow the use of roentgen ray and radium.

In generalized blastomycosis the strict regimen of a tuberculosis sanatorium would be of great value, supplemented by the drug therapy already

mentioned. Cases of surgical blastomycosis should receive the treatment given generalized cases with additional operative measures as indicated.

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DISCUSSION ON THE PAPER OF DR. BENJAMIN DAVIS

DR. ARTHUR H. SCHWARTZ, Duluth: I want to bring out a few points in the differential diagnosis in cases of blastomycosis on the clinical side. Very often the clinical diagnosis of blastomycosis does not tally with what we see under the microscope.

I want to present lantern slides of three cases that appeared in my department, which will serve to bring out the points in the differential diagnosis. The first is a case of blastomycosis, and I wish to show here the method of advancement of the disease. You will see here a large white scar where the patient originally had the disease, and its method of advancement. I also want to show the multiple abscesses scattered throughout, you see the droplets of glary pus.

This is another picture of blastomycosis showing practically the same type lesion.

This is a picture of an epithelioma, and you will notice here a large ulceration with a bloody crust and yellow edge, a pearly border, and with great destruction of the tissues.

The important point in the differential diagnosis in epithelioma is the pearly border with an inflammatory areola which does not contain the multiple abscesses that blastomycosis does.

We have here a picture of tuberculosis verrucosa cutis of the foot. This condition is most frequently confused with blastomycosis. You will notice here that there are multiple abscesses, the same as in blastomycosis. It has also the elevated border, but it lacks the inflammatory areola. The lesions here are not as numerous as they are in blastomycosis, and the condition is more frequently found in younger individuals.

There is one point I want to mention in blastomycosis, and that is, that ordinarily in our text books it is stated that blastomycosis lacks pain. I wish to say that my experience has been that most of the patients with blastomycosis suffer quite a great deal.

Another point is that blastomycosis has a very peculiar odor quite typical of the disease.

PYELITIS*

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Mankato, Minn.

Definition. Pyelitis is an inflammation of the renal pelvis and its calices. It may be associated with pyelonephritis in which the parenchyma of the kidney is involved, or pyelonephrosis where abscesses exist in the kidney substance. These latter conditions are often progressive stages of the same infection, or concomitant. Pyelitis may also be associated with inflammation of the ureter, and bladder.

One should be on the alert for possible involvement of the renal pelvis in all infectious diseases, as well as in all cases of pyuria even if only of mild or moderate degree, for with early treatment most cases can be quickly cured. Depending on the bacterial cause and the state of bodily resistance to infection, will depend the degree and the duration of the inflammation, and likewise the nature and persistence of treatment required.

The greatest aid to diagnosis in infectious conditions of the kidney has come in the development of cystoscopy and ureteral catheterization. Not only have these methods facilitated diagnosis, but they are also valuable factors in therapeutic application, when the disease has been established and recognized.

Etiology. Almost all cases of pyelitis are of bacterial origin. It requires, also, a local factor of diminished resistance to allow the bacteria to attack the kidney pelvis. Normally the kidney pelvis resists infection to a marked degree. If, however, trauma, mechanical obstruction to drainage, or the irritation of certain drugs affect the pelvis, bacterial attack soon takes place. Infection and inflammation may persist for many years without marked destruction of tissues; likewise, bacteria may be excreted in the urine for long periods without affecting the kidney pelvis; but with added irritation, as by stone, or pressure, or urethral stricture or kinking, the integrity of its structures will quickly fail. A "locus minoris resistentiæ" once established, bacterial invasion is usually prompt.

The bacteria most frequently associated with pyelitis are: staphylococcus pyogenes aureus and albus, streptococcus, pneumococcus, typhoid and

colon bacillus, tubercle and diphtheria bacillus, and gonococcus; usually present in pure culture, they may be mixed with other bacteria, due to secondary infection. When bacteria can be demonstrated microscopically, but no growth obtained by ordinary culture and staining methods, one should make anaerobic cultures and use special stains. In acid urine, if in doubt, always look for the tubercle bacillus. The micro-organism most frequently present is the colon bacillus, not always as the primary infection, and often as a secondary infection.

Bacterial invasion of the kidney may occur in one of four ways: (1) hematogenous; (2) urogenous; (3) by contiguity; (4) through a penetrating wound.

Hematogenous infection, by far the most frequent source, may occur in any condition in which bacteria are free in the circulation. The pyelitis associated with acute infectious diseases, including the exanthemata, is caused in this metastatic way. Quite recently Bumpus and Meisser¹ of the Mayo Clinic showed from experiment, as well as from the study of clinical cases, the definite relation of focal infections in the teeth and tonsils to pyelonephritis, and cite cases where the removal of these foci not only cleared up the kidney infection, but where inoculation of rabbits with the infectious material from the teeth of these patients caused a similar kidney infection, showing not only the possibility of a hematogenous infection, but also the elective localization of the streptococci for certain organs, as shown also by Rosenow in 1915². They recovered green-producing streptococci in pure culture. These investigators also studied the relative ability of the streptococcus and colon bacillus to grow in otherwise sterile urine, showing the persistent growth of the colon bacillus and the difficulty of growing streptococci. This observation is of clinical interest because of the frequency of finding the colon bacillus in the urine of these patients, in cases where the true cause is a streptococcus or other bacterium and the colon bacillus only a secondary infection. The finding of the latter should therefore not deter us from seeking other sources of infection with the object of their elimination.

Urogenous infection occurs in the presence of urethritis, cystitis, prostatitis, vesiculitis or ureteritis, and is enhanced by any obstruction to the urinary outflow. Infection may travel along the mucous membrane or the ureteral lumen; but in most cases it will be carried from the lower urinary

*Presented before the Southern Minnesota Medical Association, Mankato, December, 1921.

organs to the kidney by the general circulation, via the vesico-ovario-renal anastomosis, or along the blood vessels of the ureter; it may also travel by way of the communicating lymphatics.

By contiguity, infection usually travels from the colon by way of the lymphatics. While the colon bacillus ordinarily is not virulent, in diarrhea, acute appendicitis and intestinal obstruction, the colon bacillus gains in virulence, and the permeability of the intestinal wall seems to be increased.

The method of infection through a penetrating wound is obvious. Occasionally very virulent bacteria may cause inflammation without local defects; and certain bacteria which decompose urea, thus producing substances which are irritant to the kidney pelvis, will cause pyelitis, as for example the diplococcus ureæ liquefaciens and sometimes a staphylococcus albus which decomposes urea.

Accessory factors which determine pyelitis are: lowered general or local resistance due to general disease, constipation, enterocolitis, calculus, nephritis, cystitis with retention, stricture of ureter or urethra, hypertrophied prostate, phimosis, traumatic contusion of the kidney; chronic passive congestion, acute appendicitis, pelvic and general peritonitis, nephropothesis, pressure of adjacent tumors, the pregnant uterus or a distended colon, on the kidney or ureter; and various parasites, such as actinomycosis, filaria, echinococcus, bilharzia.³

Tuberculous pyelitis may be followed by secondary infection with pyogenic bacteria. Paralysis of the bladder due to spinal cord disease predisposes to kidney infection. Gonorrheal infection of the kidney pelvis is comparatively rare, and is usually associated with other bacteria. Instrumentation of the urethra, bladder or ureter may be responsible for lowering resistance or carrying infection to the kidney. Early cases of pyelitis are often unilateral, especially if due to trauma, contiguity, or ascending or urogenous infection. If pyelitis continues any length of time, it usually becomes bilateral; it is most frequently so if caused by a metastatic or hematogenous factor.

While calculus is mentioned as a cause of pyelitis, calculus formation is frequently secondary to pyelitis. This is important to remember, and every case of kidney stone in which nephro-lithotomy is done, should have treatment for the associated pyelitis until it is cured, to avoid recurrence of stone due to this infection. The pressure of the

pregnant uterus is often associated with a toxemia or other infection, in the production of pyelitis. The condition is not rare in pregnancy and should be looked for in all cases of pyuria in pregnant women.

Pyelitis may occur at all ages. Infants frequently suffer from it; soiled diapers (direct infection with the colon bacillus) and phimosis, with extension upward through the lymphatics, are the most frequent source of infection. In infants and children the infection is usually due to the colon bacillus, but may be due to the streptococcus, as in the acute exanthemata. While the condition in children can often be diagnosed by simple means, it may be necessary to resort to cystoscopy for differential diagnosis. In aged patients, paralytic and other obstructive factors are mostly causative, infected teeth and colon stasis also being prominent causes.

Pyelitis may be acute or chronic. In acute cases the mucous membrane is swollen, red, and covered with red blood cells, pus cells, desquamated epithelial cells, mucus and bacteria, and (in alkaline urines) phosphates and oxalates. In chronic pyelitis the mucous membrane is grayish or brownish in color, thickened and sometimes ulcerated. The ulcers sometimes become deep enough to perforate and may cause a perinephritic abscess or establish a fistula into a neighboring hollow viscus. When ammoniacal decomposition of urine occurs, the destruction of the mucous membrane of the renal pelvis is most marked. Rare conditions are gangrenous, fibrinous or membranous pyelitis. The corresponding ureter is usually involved in the inflammatory process, and especially the vesical mouth of the ureter, which latter is a valuable sign in the diagnosis of pyelitis. Stricture, kinking, or other obstruction of the ureter leads to dilatation of the renal pelvis and to hydro- or pyonephrosis, the entire kidney becoming a pus sac eventually. The pus may become inspissated and result in a cheesy and often calcareous functionless kidney, resulting eventually in an auto-nephrectomy. Associated with a pyelitis may be a pyelo-nephritis and a chronic interstitial nephritis.

Symptoms of pyelitis are constitutional and local. The general symptoms depend on the kind and degree of infection. Usually there are toxemia, chills, fever and sweats, general depression, loss of weight and disturbed digestion. In chronic cases the renal irritation will cause polyuria, and in children enu-

resis. Uremia is rare, because both kidneys are seldom the seat of a sufficiently destructive process to cause anuria. In children, obscure fever and sweats, with digestive disturbances and vague abdominal pain, should always make one suspect a possible pyelitis. Fever and sweats are rather capricious in most cases of pyelitis, even in adults. An associated constipation and distension of the abdomen may simulate intestinal obstruction. Sometimes the general symptoms obscure the local ones, and only routine urinalysis and physical examination will determine and localize the disease.

The local symptoms are pain and urinary changes. Increased frequency, with burning urine having a sediment, will give the indication for further examination. In acute cases the amount of urine is usually diminished, although there is an increased frequency. Infection caused by the colon, typhoid or tubercle bacillus is usually associated with an acid urine, and even in cases uncomplicated by nephritis there is albuminuria, due mostly to pus and red blood cells. The microscope shows pus cells, red blood cells, epithelial cells, mucus, fibrin and bacteria. In order to exclude pus and red cells due to contamination by a urethral or vaginal discharge, vesical catheterization should be employed in obtaining a urine specimen. Further localization of the disease is obtained by cystoscopy and ureteral catheterization. This, however, should be avoided in acute inflammation. In these cases other localizing symptoms such as pain and tenderness will determine the diagnosis, in conjunction with urinalysis and the general symptoms. All chronic cases of pyuria require cystoscopy and ureteral catheterization, with chemical, microscopic and bacteriological examination. The process towards recovery or otherwise can best be determined by counting the number of pus cells in an uncentrifuged specimen of urine, obtained by ureteral catheterization. Pain is usually localized over the affected kidney, but may radiate down the thighs and towards the pelvis; there may be but a sense of weight in the kidney region. In children pain referred to the abdomen is often due to pyelitis. Tenderness over the kidneys can be elicited by direct palpation or by the fist percusion of Dr. J. B. Murphy; however, the latter should be done carefully, as it sometimes causes most exquisite pain. By laying the one hand flat over the kidney in the angle between the twelfth rib and the erector spinæ muscle and producing a sharp blow with the

closed fist of the other hand, this sign can be obtained and has a definite value.

Prophylaxis. In general diseases one should sis; as soon as pyuria develops, examine the kidneys by palpation and fist percussion for possible involvement. Give febrile patients no irritating food or drugs and plenty of bland and, preferably, mildly alkaline liquids to drink, or by rectum. Protect the body surface from chill. In disease of the lower urinary organs, avoid unnecessary instrumentation and avoid contamination with infectious organisms. See that the bladder is sufficiently drained and the urinary passages flushed by copious watch the kidneys by sufficiently frequent urinaldrinking of bland fluids. Pregnant women should be guarded, by restful positions, against abnormal pressure on the ureters. In nephroptosis, proper support should be worn, to avoid kinking or pressure of ureters. Remove obstructions such as stricture, prostatic hypertrophy or phimosis; also, foreign bodies, as stone of bladder, ureter or kidney pelvis. In open wounds near the kidney, proper asepsis and antiseptics are indicated.

Treatment. If possible, remove the cause first of all; this may be sufficient to effect a cure. In acute pyelitis put the patient to bed, keep the body warm, give large quantities of fluid by mouth and alkalinize the urine (this latter is enhanced by giving fruit juices and vegetables and carbohydrates); avoid highly seasoned foods, alcohol, proteins, and irritating drugs. Dry heat to the kidney region is desirable. Open the bowels and use the usual treatment for febrile conditions. If there is nausea, give fluids by rectum.

In acute cases with acid urine, it is best to give potassium citrate in large doses, frequently repeated, to alkalinize the urine, after acute symptoms have subsided. A valuable drug is hexamethylenamine, dose according to age (usually 30 to 40 grains a day in adults); this must be given freely diluted, since the urine that is concentrated is very irritating to the bladder owing to the formaldehyde which is being excreted. Hexamethylenamine is effective only in acid urine and should never be prescribed in combination with an alkali. If the urine is alkaline due to fermentation or other causes, give sufficient monobasic acid sodium phosphate to acidify it moderately—but not excessively; usually twice the amount of the hexamethylenamine is sufficient.

Hexamethylenamine should not be used continuously for more than five to seven days, especially if bladder irritation becomes marked. It is well to alternate every five to seven days, using it and the acid sodium phosphate for these days, and then salol with sodium bicarbonate or citrate of potash solution. This alternating method of prescribing urinary antiseptics has a definite destructive action on bacteria, and also is less irritating to the inflamed organs. In children especially, and in very acute cases, citrate of potash is preferable to hexamethylenamine. A good rule is to begin with alkalizing drugs in acid urines, and to acidify the urine when it is alkaline in the beginning, to inhibit bacterial growth—then alternate as above mentioned.

In very severe acute pyelitis, with pyelonephritis, it may be necessary to incise the kidney and drain its pelvis this way, to avoid destructive action of the secreting portion of the kidney, or general intoxication. In perinephritic abscess due to a perforated kidney pelvis, operation with drainage is indicated.

Chronic pyelitis is often very resistant to treatment and sometimes practically incurable. Remove the cause, if possible; institute proper diet, and flush by copious drinking of bland liquids. See that there is no obstruction to the outflow of urine. Remove foreign bodies from the kidney pelvis; keep the bowels active; protect the body surface from chilling. Alternate use of acid and alkaline antiseptics is indicated following a definite routine, and checking up its efficiency by frequent urinalyses. Careful use of stimulating drugs as balsam of copaiba may be beneficial. Improve the general health of the body.

During recent years lavage of the renal pelvis and the instillation of antiseptics, especially the silver salts, has been practiced with great benefit. By catheterizing the ureters and instilling a suitable antiseptic into the renal pelvis, one can often note improvement after one or two treatments. Various drugs have been used for this, such as silver nitrate, silver iodide, or the organic silver compounds. Young, White & Swartz⁴ advocate the use of mercurochrome 220, because it is the least irritating and has the most penetrating quality, reaching the submucosa and deeper tissues. Richet⁵ advises a variation of antiseptics. O'Connor⁶ states that, from a purely experimental point of view, it

would seem that pelvic lavage done alternately with silver nitrate and mercurochrome 220 might give us better results than those achieved by the sole use of either. Geraghty of Baltimore and Kretschmer of Chicago are strong advocates of the use of nitrate of silver alone, claiming that the reaction following its use is to a certain extent responsible for the favorable results obtained. Hagner of Washington, D. C., advocates the injection of Bulgarian bacillus suspension in chronic pyelitis associated with alkaline urine.

Vaccine, autogenous or stock, may be tried, but it is of doubtful value. In pyonephrosis operation is indicated. Drainage through an operative incision may cure the case, especially if no stone, ureteral kinking or tuberculosis exists. In the latter cases, especially with destruction of kidney substance, nephrectomy may be indicated. Of course, the functional ability of the other kidney must first be definitely established, before nephrectomy is performed. All obstruction to urinary outflow must be corrected if possible, by urethrotomy, prostatectomy, ureteral section and plastic, nephropexy, or cystostomy.

SUMMARY

1. The prompt cure of pyelitis depends upon an early diagnosis, and prompt recognition of the source of infection.
2. Focal infection is the most frequent cause, and is often followed by secondary colon bacillus infection.
3. In children pyelitis is of frequent occurrence.
4. Calculus recurrence is often due to a persistent pyelitis.
5. Treatment in acute cases consists of rest, bland diet, alkalization of urine.
6. Chronic cases require elimination of primary infectious focus, alternating use of hexamethylenamine and citrates at intervals of five to seven days. Lavage of kidney pelvis with nitrate of silver and mercurochrome alternately is indicated in persistent cases.

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DISCUSSION ON THE PAPER OF DR. A. E. SOHMER

DR. HARRY P. RITCHIE, St. Paul: This subject may be discussed from many different angles, but Dr. Sohmer has so comprehensively covered it that I shall limit my brief remarks to two clinical observations. Whether we consider this condition we call pyelitis as a primary or associated disease, there is no question but that clinically it is a definite and distinct entity in the exhibition of symptoms.

So far as I am concerned, the diagnosis is not an easy one, but requires a lot of study and examination, and yet the temptation is to meet an emergency situation that is important. I think mistakes are very often made in the

differentiation between pyelitis and acute abdominal pain, and they are due to the fact that the symptoms are so imperative we misinterpret them and do not make a careful study of them. In all of these kidney infections we are supposed to make the diagnosis by exhibiting signs in the urine, but in the early acute processes the kidney may be almost inhibited; and yet it is not infrequent to exclude pyelitis in an emergency situation by one examination of the urine. These patients should be examined carefully. We must remember this thing may come to any one. It is no respecter of persons nor of age, and it may occur to any one at any time, and I think very often we overlook and forget the possibility of it. In adults there seems to be a peculiar mental stage in pyelitis cases, amounting almost to a depression, even to a melancholia, and I think there are hardly any cases more trying and requiring our tact and careful analysis more than these sufferers in whom there is a mental change. I think the first attack is by far the most important one. In fact, it is a question whether they do not have the footprints of this disease for a long time and I think that these people should be called back for repeated examinations later.

In the treatment we have several things that can be used. I don't care very much about dietetics. Rest is very important, and particularly in the pyelitis of pregnancy. Drainage of the kidney by posture is quite necessary, and that is a very essential feature of the treatment. I agree with Dr. Sohmer that the use of urotropin alone gives no clinical evidence of satisfactory or immediate results. It must be used in combination with some form of diuretic.

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No. 5

EDITORIAL

TO ALL MEMBERS OF THE MINNESOTA STATE MEDICAL ASSOCIATION

Attention is called to a letter sent to every County Medical Society of the Minnesota Medical Association, by Dr. Riggs, on Dec. 20, 1921. In this letter, discussion of one of the problems confronting the medical profession of the State is so clearly set forth that we will not take your time to reiterate them. Dr. Riggs' explanation is so clear that these letters should be read again.

The problems of today are: 1st. Lowering the standards of medical treatment by admitting osteopaths and others to full practice of medicine and surgery. 2nd. State Medicine, a substitute for universal Health Insurance. 3rd. Question of insuring support and fealty to Doctors from the laity.

To meet two of these problems, the legislature must be educated. It is only through the people at large having a good understanding of medical conditions that anything can be done in our legislature. Therefore the Council of the Minnesota State Medical Society felt that every component County Society must take up the battle. Each Society should have a committee on legislation. It is desired that the committee should organize public meetings to be addressed preferably by a layman. This speaker should be not only friendly to the medical profes-

sion, but he should have a comprehensive medical vision. It is not selfish interest that inspires this so much as it is a desire to make existence possible for the medical men, whose sole purpose is welfare of humanity. The public must have competent medical care. The Doctors are agencies through which this has come and is to come. They must not be destroyed or harassed. The medical profession has been established for the sole purpose of serving humanity. It has been built up through the efforts of countless individuals. It represents institutions by the score, whose purpose is to maintain efficiency and integrity in its ranks.

Medical education has become so standardized that only the well qualified can enter the ranks of the medical profession. After graduation, education is not neglected. There are County Societies with their courses of study; the State Medical Society and the A. M. A. Association as a final clearing house and mold of ideals. The efforts of the American College of Surgeons to maintain high standards of efficiency has its counterpart in many of the National Societies devoted to various specialties. Add to this the almost endless list of medical journals, the numerous well-attended clinics and the great list of teachers, both in and outside universities and colleges, and one sees that the Medical Profession rests on a strong foundation and that it is an immense structure.

"A license to practice is not an endorsement, but is an instrument to protect the public from the one who is licensed."

Literature and information concerning legislative personnel are in the hands of Dr. J. F. Savage of St. Paul, chairman of committee on legislation.

Direction of the work is under Dr. H. M. Workman of Tracy, Minn., for the organization of County Societies.

Suggestions as to procedure may be obtained from this committee.

J. F. CORBETT,
R. J. HILL,
H. M. WORKMAN, Chairman,
Committee on Publicity.

The Gassed Soldier

The experience of having had a "touch of gas" was so universal among the various units close to the war front that smiles were ordinarily evoked when anyone took a "touch of gas" seriously. A severe dose of gas with its agonizing air-hunger

and often slow but sure death was an entirely different proposition. Between these two extremes ranged various degrees of exposure to the different gasses, all of which produced similar respiratory symptoms.

With the gassed cases that were not fatal, the federal government has had a difficult problem in determining the degree of resultant disability, and has doubtless given a large number of ex-soldiers the benefit of the doubt in the matter of compensation.

An admirable report of a Board of Medical Officers convened at Camp Grant has summarized the results of examination of two thousand gassed soldiers in the chronic stage. Investigation showed that while the symptoms resulting from the various gasses were much the same in the acute cases, those subjected to chlorine poisoning complained mostly of suffocation and of a constricting of the chest; the acute mustard gas cases suffered frequently in addition from epistaxis; phosgene cases complained of a peculiar general weakness in addition to respiratory irritation.

Autopsy reports of acute cases give us an accurate conception of what took place. There has been little opportunity to observe the pathology in chronic gas cases and we are forced to form our ideas of the existing pathology from physical examination, and anemnesis and perhaps most instructive of all a reasoning from the known condition in acute cases. The lung in the acute case is described as being markedly congested, distended and forming, as it were, a non-collapsible cast of the chest cavity. Various grayish areas of emphysema disseminated throughout the congested areas are described. The bronchial mucous membrane is congested and covered by a greenish muco-purulent exudate. Pleural adhesions have been found.

The picture of the acutely affected lung makes possible a very reasonable conception of the chronically diseased lung resulting from gassing. There must be emphysematous areas of variable degree and in the severer cases connected tissue change in the bronchial mucous membrane and in some cases even an adhesive pleuritis.

Many of the chronic cases are perfectly normal so far as methods of physical examination are able to disclose. Some present the harsh, high-pitched breath sounds with moisture disappearing after coughing, the signs sometimes found in chronic bronchitis. A fewer number are slightly emphy-

sematous and present some chest rigidity, poor excursion of the diaphragm, a poor chest expansion, hyperresonance and diminution of breath sounds.

These men all tell about the same story. They "catch cold easily," cough more or less all the time, are short-winded, have chest pain, burning eyes and feel better when out of doors.

Hill, after studying acute cases, sees no reason "Why recovery of the lungs should be any less perfect after chlorine poisoning than it is after broncho-pneumonia." The Camp Grant observers feel that "there is no apparent reason why these subjects should not regain normal respiratory functions and rid themselves of their gradually disappearing symptoms."

It would seem that the condition need not be a progressive process similar to the ordinary emphysema, which results in right cardiac strain. The consensus of opinion seems to be that a gassed individual is not predisposed either to the contraction of pulmonary tuberculosis nor the activation of an already present focus. Nevertheless, there would seem to be no reason why a gassed case should not develop pulmonary tuberculosis.

These chronic gassed cases doubtless have a reduction in their oxidation mechanism which, in most cases, is impossible to accurately gauge.

Whether the recent agreement at the Washington Conference results in successfully eliminating the use of warfare gas on the part of the nations concerned or not, our recent experience with this new method of warfare adds simply another argument against the time-honored method of settling international disputes by war.

Medical Advisory Committee

The following resolutions were adopted by the Blue Earth County Medical Society at its last regular meeting, Jan. 30, 1922:

RESOLUTION

WHEREAS, the Public and Profession are being sold out to

- (1) Foundation control of "full time" medical education.
- (2) Lay board domination and the "closed shop" hospital.
- (3) Socialized state medicine, subsidized community health centers and hospitals under political or university control.
- (4) Legislative dictation of therapy and fees.
- (5) Demoralization of medical standards by the expansion of cults.
- (6) Exploitation of the specialties by lay technicians.

THEREFORE, BE IT RESOLVED that all the Delegates of the Minnesota State Medical Society to the A. M. A. meet-

ing in St. Louis, Mo., May 22-26, 1922, are hereby instructed to vote for

- (A) A change of policy and leadership in the A. M. A. pledged to the immediate abolition of the evils mentioned, and constructive protection of medical interests.
- (B) The repeal of multiple representation and plural voting privilege by Section Delegates.
- (C) The election of Trustees for a period of two years; five Trustees to be elected one year, and four the next, to prevent the Trustees from perpetuating oligarchical rule."

BE IT FURTHER RESOLVED that copies of these Resolutions be sent at once to the Official Organ of the Minnesota State Medical Society, the Journal of the A. M. A. and the Medical Advisory Committee.

(Signed) A. M. SNELL, Secy.

Passed January 30, 1922.

The above resolution has been widely distributed and, presumably, to each of the component county medical societies of the State Association by the Medical Advisory Committee.

To date the only Minnesota society which has adopted this resolution is the Blue Earth County Society, which took favorable action on January 30, 1922.

It should be explained that the Medical Advisory Committee is a self-constituted committee of A. M. A. delegates who took exception to some of the policies favored by certain officers of the association at the Boston and New Orleans meetings. Dr. Ochsner, of Chicago, is chairman, Dr. Rooney, of Albany, vice chairman, and Dr. McMecham, of Ohio, secretary. The membership includes the names of many prominent physicians throughout the country.

Although the above resolution is rather vague and appears to be the outburst of a group of spirits opposed to the "status quo" of the medical profession in general, blaming existing evils on the present administration of the A. M. A., they have certain specific complaints and propose definite remedies.

One complaint is to the effect that certain high officials of the A. M. A. strongly favored compulsory state health insurance in 1916, are now condemning it and favoring the community health center, which, it is claimed, is only a species of socialized medicine.

The Shepard-Towner Act is classed as a wedge for socialized medicine and an instance, among many, where the practice of medicine is being taken out of the hands of the profession. The officials of the organized profession are charged with sins of

omission in allowing such a bill to pass. We do not think so.

Attention is called to the fact that the Bureau of Vocational Training for Veterans authorized and has at present ex-soldiers in training at schools for chiropractic. The A. M. A. is accused of having made no effort to block such a regulation, which was doubtless the result of political pressure brought to bear in Washington. As a matter of fact vigorous protests by the council succeeded in postponing this regulation, which was passed two years ago in spite of the protests. Recently this regulation has been rescinded.

The dearth of regular practitioners is deplored and laid at the door of the Rockefeller Foundation, which put many small medical schools out of existence through Flexner's report several years ago. The rapid growth of cults such as osteopathy and chiropractic is attributed to this lack of regularly trained medical men. This lack of medical men may exist in certain God-forsaken parts of the country but statistics show no proportionate dearth of physicians throughout the country.

Other causes for dissension are: Medical student body limitation, the teaching of ultra-scientific courses, the great increase in the cost of medical education, the "closed-shop" hospital, the invasion by the government of the field of medical practice in the matter of regulation of drugs, alcohol, child-birth, etc., etc.

The Advisory Committee seeks a remedy for ills in a change in the official personnel of the American Medical Association. In order to effect a quicker change in officers a change in the Constitution is advocated whereby Trustees are to be elected for two instead of three years. An elimination of the voting power of delegates representing the scientific sections is also advocated so that the House of Delegates will represent the component State Associations only. This is a question of organization and will be decided at the May meeting by the delegates themselves. It should be stated, however, that short terms of office has one important disadvantage in that a two-year period is a rather short time for a medical man to become thoroughly acquainted with the various duties of a Trustee.

Lively discussion of the various medical problems is a healthy sign and of distinct value. Only through discussion are medical policies to be formulated. The Medical Advisory Committee has performed a distinct service in this line. On the other hand, its criticisms seem for the most part destruc-

tive. The practice of medicine has shown marked changes in several aspects within the last decade or two and there has been a decided realization of the value of preventive medicine. While the medical profession individually realizes the value of prevention of disease it is a question whether the organized profession has done its share in the matter of the instituting of constructive preventive policies. Numerous preventive activities have been inaugurated by the laity, for example the anti-tuberculosis societies, tuberculosis preventoriums, the Life Extension Institute and similar organizations, child welfare clinics and now the maternal and infant welfare activities. These are distinctly medical enterprises and while the profession has been more or less represented it is important that medical men should realize their responsibilities and be more actively concerned. As to how this is to be done, the Medical Advisory Committee does not offer a bit of constructive advice.

Compulsory State Insurance was favored by certain officers of the A. M. A. a few years ago. At least one of their officers recently stated that this issue is now a dead one. The agitation seems to have been transferred to the question of community health centers and legislation is being actively advocated, notably by the Missouri Tuberculosis Association, for State support of these centers.

What is to be the attitude of the professions on this issue which provides for State aid or support of medical centers which will be in the nature of hospitals and dispensaries?

It is interesting to reflect on the source of the maintenance of the present-day hospitals and dispensaries. Some are in whole or in part supported by city or county, or, in the case of the private hospitals, by private subscriptions or endowments or by a group of staff physicians themselves. The last mentioned strictly private hospitals are more common in the smaller towns and constitute a small minority. As a result many of the sparsely populated districts go without.

How will the general institution of community medical centers affect the medical profession? It need not affect the present personal relations between doctor and patient at all. It may result in socialized medicine—the group treatment of a group—unless the profession is active in guiding what is likely to be inevitable legislation. In any case large appropriations will come under the influence of politics.

Is the establishment of community health centers by the state going to remedy the deplorable lack of medical instruction and care in the sparsely populated districts of our country? This is the question to be thrashed out by laity and profession alike. And in approaching the question the profession, while standing for its rights, must not lay itself open to the accusation of selfishness. Reports indicate very conclusively that the people of the country as a whole as compared with foreign countries are not receiving the medical care they are entitled to, particularly in the matter of prevention of disease. Who is going to take up this phase of the work which is so largely educational? The medical profession should.

The Child's Health

The question of the child's health deserves the serious consideration of parents, educators and doctors.

The proper physical, mental and moral development of a child is in a very large measure dependent on right home influence. Discipline is a greater kindness than uncontrolled generosity, which is many times a form of selfishness in parents. Schools and other agencies cannot supplant a good home, nor should they be expected to assume parents' responsibilities.

Educators in general should realize that health, physical and mental, must take precedence over any scholastic demand. Such a realization would tend to facilitate school work and prove beneficial to teachers and pupils.

The director of hygiene in schools should rank with the director of education and in matters of health be supreme. Presumably a doctor knows better how to choose a text-book on hygiene than does an instructor of gymnastics.

A greater interest on the part of the physician in preventative medicine is needed. His duty begins somewhere at a point before a morbid condition presents. It does not cease with the performance of an operation or the writing of a prescription.

Leadership in health matters must remain in control of the medical profession, which is ostensibly best equipped for that work. Service in its broadest sense is the great requisite of this leadership. The tendency of doctors to overlook this, to wrap themselves in a cloak of superiority and splendid isolation, means state medicine, which would be an unfortunate result for doctor and patient alike.

OBITUARY

Cyrus Northrop

The passing of Cyrus Northrop, President Emeritus of the University of Minnesota, stirs again the memory of the many years in which his fostering fatherhood, his broad vision, his untiring counsel prepared the way for the progressive development of the Medical School. We remember gratefully how his guiding hand held the helm for us in many a rough passage of those early days; how he ever held our head up into the wind to keep the course that his faith in the future of the school approved. We recall the inspiration which he constantly gave to the University and the School, toward a love of the work for the work's sake, toward high educational ideals, toward the cultivation of a spirit of service—a true University spirit—among us.

His memory, the memory of the man he was and the work he did, will be cherished so long as the University of Minnesota, the monument his brain, his hand had chiefly reared, to the honor of the State and the highest welfare of her citizens, endures.

DR. PIERRE A. HILBERT

Dr. Pierre A. Hilbert was born in the Grand Duchy of Luxemburg in the year 1865. Nationally he was a mixture of French and German. His parents had known prosperity in the doctor's younger days and were able to give the older children, especially his brother and himself, the advantages of a university education in Luxemburg.

Financial adversity overtook his father and necessitated the taking of the two boys, Ferd, the elder, and Pierre, the younger, out of college before they had finished their college education in Europe. The old gentleman was of a happy turn of mind and told them not to worry because they would soon be in America, where they would break "*a la forchet*," meaning that they would soon be in a country where they would be so prosperous that they could have meat for breakfast, and, therefore, would need a knife and fork.

They came to Minneiska, Minnesota, near Winona, when the doctor was nineteen years old. The doctor, in his early days, worked on the farm, attended Winona Normal and taught school. He acquired a knowledge of English very rapidly, spoke the German language perfectly and had a working knowledge of the French language. He entered the state university as a medical student in 1890, graduating in the class of '93.

In 1891 I first became acquainted with the Hilbert boys, Ferd and Pierre. The elder brother Ferd was that well-grounded in the knowledge of Greek and Latin and the modern languages that he never needed and never owned a medical dictionary, and I do not recall ever finding a

word in the literature or vocabulary, used commonly by the medical profession, that he could not define instantly because of his intimate knowledge of the languages mentioned.

Pierre Hilbert, younger of the two, was not so proficient a scholar nor was he so philosophical as his older brother. He had a keen, perceptive mind, however, and was quite resourceful, managing to get by his quizzes, all save anatomy, and probably Dr. Hendricks, who then taught anatomy and whose personality and questions were so abrupt at times, frustrated the student, Pierre Hilbert. However, he made his grades with greater ease than the average student. He did not pore over books much; he didn't need to.

The class of '93 was the first class to graduate on the campus at the state university, the previous classes having graduated from what is now the old Asbury or Deaconess home.

I also must mention that the class of '93, because of real and imaginary disadvantages mostly necessitated by events over which the medical faculty had no control, went out on a strike, drawing up resolutions, sending one copy to the President of the Board of Regents, one copy to President Northrop, and one copy to Dr. Millard, who was then Dean of the Medical School. The senior class walked out in a body, with the exception of two women students. The various professors, for a number of days, lectured to empty seats and these two women students. Dr. Millard told us that we could return by apologizing to *the faculty* "individually or collectively." We flatly refused and were reinstated without any apologies.

It was along about the spring of the year that the prospective graduates were looking out for new locations, the all-important thing to the younger doctor. Dr. Hilbert's correspondence was with the widow of a doctor who had practiced in Melrose. He used to show and translate her letters. In one of them she said that "the doctor who located in Melrose and who would attend to business, leaving booze alone, would grow "stein reich," meaning stone rich. She was a prophetess. Dr. Hilbert had the qualities of thrift, and prosperity was innate in him. He did not need to acquire thriftiness and in that respect his career was in marked contrast to the average doctor. I used to fear that he would bend his splendid faculties to the acquiring of money alone and would neglect the welfare and forget the humane side of his profession. However, that was not the case. He was the right man in the right place. Melrose has, tributary to it, a very fertile soil and the most economic and prosperous people. Even in the hard times of '93 the doctor did not lose 1 per cent of his earnings. He understood the class of people with whom he worked. He knew the difficulty of prying the dollar loose from the stolid German; but he had a faculty of doing that, at the same time making his client feel satisfied.

It used to be amusing to meet with Drs. Ferd and Pierre Hilbert, as I often did, in consultation. They usually spoke English; if they did not want me to understand they would speak German. If there were Germans around they might resort to French and then no one could get it. As he grew in years and experience he had developed an aptitude for politics. Appointments seemed to come to him unsolicited. To my mind in that particular line he was somewhat of a conundrum. He expressed his views tersely and

to the point and often, I thought, recklessly. In temperament he was of the Rooseveltian type. He could be conciliating or brusque; abrupt and sometimes overbearing. However, those who did not agree with him were compelled to respect him, if not fear him. Opposition seemed to develop this quality; in fact, I sometimes thought that he enjoyed it. Whatever he did he put a personality and intensity that you often observe in men of character. He'd play "penny ante" with as much intensity and scrutiny as if he was putting over a 100,000 dollar deal.

He was a loyal friend—a friend who could see the faults of his friends and was as free to criticize as he was to compliment and encourage.

Dr. Hilbert, in matters of importance, was free to express his opinions and define them regardless of professional or business consequences.

When the great World War broke, Dr. Hilbert's intimate acquaintance with European affairs, his knowledge of the temperaments and customs of the French and German people and the designs, you might say, of the Prussian power, caused him to be an ardent and an earnest defender of the cause of the Allies. His location, his environment, his patrons and the interest of his profession and business, had they been consulted, would have induced a weaker character to at least be silent during the great crisis. He was quick to detect sham and was equally quick to rebuke it. He had little time for the shyster, either in business or politics. He was fortunately so situated financially that his bread and butter was assured without the salary that went with the job. His alertness in discovering or discerning selfish motives together with his independence in politics made him a useful member of the board and enabled him to render great service to his state.

Personally the compliment Hamlet paid to Horatio comes as near fitting Dr. Hilbert as anything I could say: "Since my dear soul was mistress of her choice, And could of men distinguish, her election Hath seal'd thee for herself: for thou hast been As one, in suffering all, that suffers nothing; A man that fortune's buffets and rewards Hast ta'en with equal thanks: and blest are those Whose blood and judgement are so well commingled That they are not a pipe for fortune's finger To sound what stop she please. Give me that man That is not passion's slave, and I will wear him In my heart's core, ay, in my heart of heart, As I do thee."

A. J. GILKINSON.

Dr. Earl E. Cannady, of Prior Lake, Minn., died at Monrovia, Cal., March 30th where he had gone a short time before in quest of health. Dr. Cannady was thirty-seven years of age and had been in failing health for the past two years.

Dr. G. MacMurphey, who has been practicing at Ortonville for many years, died at his home there in March.

Dr. Jacob Eaton Bowers, Duluth, Minn., graduate of Michigan Medical School, Ann Arbor, 1869; formerly superintendent of the Rochester State Hospital, Rochester, Minn., and connected with the State School for the mentally deranged, St. Peter, died, February 23rd at St. Luke's Hospital. He was 80 years of age.

John J. Donovan, M. D., Litchfield, Minn., graduate of University of Minnesota, age 42 years, died March 32nd. Dr. Donovan served overseas during the war.

Dr. Norman C. Davis, of Badger, Minn., was found dead in his drug store a week ago. Dr. Davis was 65 years old and death was attributed to heart disease.

Dr. J. M. Buchanan died recently at his home at Green Isle, Minn.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

AMERICAN COLLEGE OF PHYSICIANS

At the convocation of the American College of Physicians, held at Minneapolis, April 7th, about 120 physicians from United States and Canada were admitted to fellowships. Among those from Minnesota were Dr. Charles Lyman Greene, Dr. R. I. Rizer, Dr. A. H. Beard, Dr. Hugh Willson, Dr. J. Fowler Avery and Dr. S. Marx White. The president of the American College of Physicians, Dr. James M. Anders, was made a master of the American College.

After the annual dinner addresses were given as follows:

(1) Dr. Leonard M. Murray of the University of Toronto, Toronto, Canada, on "Subacute Bacterial Endocarditis." (2) Dr. Aldred Scott Warthin, Professor of Pathology and Chief of the Department of Pathology, University of Michigan, on "Excretion of Spirocheta Pallida Through the Kidneys" (with lantern slide demonstration). (3) Dr. James M. Anders, President of the American College of Physicians, delivered the Annual Oration.

Dr. Murray presented a remarkably large series of cases of subacute endocarditis occurring in returned soldiers in Canada. He outlined the history of the disease, laying emphasis on its insidious onset without distinctive symptoms but with increasing breathlessness on exertion and with moderate anemia. He paid particular attention to the complications such as embolism in cerebral arteries, peripheral arteries, in liver and spleen, with the accompanying clinical manifestations. Certain peculiar forms of the condition were described and the diagnosis based upon blood culture and the changing phenomena dependent upon valvular involvement were described. One particularly interesting observation was that of rapidly developing mitral stenosis due to aneurism of the mitral valve invading the valvular orifice and giving under observation the development of the presystolic murmur typical of mitral stenosis. This rapid development of signs of mitral stenosis could, he stated, occur in no other condition. A remarkable collection of carefully preserved specimens of the condition was exhibited.

Dr. Warthin compared the problem of the excretion of spirocheta pallida through the kidneys with that of the excretion of spirocheta ictero hemorrhagica in epidemic jaundice, and by a masterly study of the conditions in some unusual cases of syphilis showed that the spirocheta in this condition appeared to be modified and caused to undergo

degenerative changes within the epithelium of the kidney tubules. When the spirochetæ had reached the lumen of the tubules they had been rendered unrecognizable as spirochetæ, and he stated that it would appear probable from his material that although in the early stages of the disease the spirocheta may reach the kidney and be excreted, it is not probable that they can be recognized in the urine. The possible relationship between renal spirochetosis and certain cases of death after salvarsan was considered.

In his presidential address, Dr. Anders outlined the function of the American College of Physicians as a body having a distinct purpose in the advancement of standards and of research in medicine, and took up the relationship which the college holds to the medical profession in the United States and Canada and the profession of foreign countries.

The program of daily clinics and demonstrations at the University of Minnesota covered a wide range of subjects in general medicine, pharmacology, pediatrics, neurology, actinology, the borderline between surgery and medicine, dermatology and the laboratories. Demonstrations were given also at the Health Department, Minneapolis City Hall; Glen Lake Sanatorium, the Hennepin County Sanatorium for Tuberculosis, and at the Students' Health Service. The visitors uniformly expressed appreciation of the advanced work going on in these fields.

SOUTHWESTERN MEDICAL SOCIETY

B. O. MORK, M.D., President
Worthington, Minn.

WM. A. PIPER, M.D., Sec'y & Treas.
Mountain Lake, Minn.

The semi-annual meeting of the Southwestern Society will be held at Heron Lake, Minnesota, on May 18th, 1922. The Society membership embraces the physicians of Cottonwood, Jackson, Rock, Nobles, Murray and Pipestone Counties. Among the visiting physicians who will take part in the program are Dr. A. M. Snell, Mankato, and Dr. S. R. Maxeiner, of Minneapolis. Outside physicians will be welcome and the most interesting program is assured.

THE ST. LOUIS MEETING OF THE AMERICAN MEDICAL ASSOCIATION

The American Medical Association is a scientific organization but is composed of members with more than the average amount of "humanity" in their makeup with social elements too long repressed. These members are weary from bearing the responsibility of many human lives. Instead of having play time they have become public teachers with no recess. The local entertainment committee of the A. M. A. have been busy preparing to show these visitors true St. Louis hospitality and to provide for them such diversions as will be both restful and entertaining.

The golfers will arrive early in order to participate in the Annual Tournament on Monday, May 22nd.

Tuesday evening the Opening Meeting will be held in the Odeon and arrangements are being made to have the music and addresses transmitted by radio to various parts of the city and to distant cities.

Wednesday evening is given over to banquets such as Alumni, Fraternal, Sectional, etc. On this evening provision is being made to entertain the visiting ladies and those doctors who are not engaged at the Alumni and Fraternity dinners at one of St. Louis' noted moving picture shows with special musical and other features for the occasion.

On Thursday afternoon the Medical Department of Washington University is giving a special Tea on the grounds of the institution. Thursday evening will be given over entirely to the President's Reception and it is hoped that as many as possible of the doctors and their ladies will grace the occasion with their presence.

The committee after visiting the offices of the Mayor and the Director of Public Welfare and being assured of their co-operation have decided to reserve until Friday evening the chief feature of their entertainment by giving a special program for the entire association in the unique open-air Municipal Opera which has a comfortable seating capacity of ten thousand. The location of the opera in the heart of Forest Park with its special lighting effect made possible by the natural foliage of the forest can be appreciated only by those who visit it at night. It is the hope of the committee that every visitor at the convention will remain in St. Louis through Friday evening.

The Ladies' Entertainment Committee under the leadership of Mrs. Willard Bartlett has arranged to take immediate charge of every lady visitor who may be persuaded to accompany the medical member of the family to the convention. They need have no fear of being left alone while the doctor is attending the scientific meetings, for practically every hour of their time has been arranged for and it is hoped that many more ladies than usual will visit the "City of Homes"—"The Friendly City."

A special visit to the Missouri Botanical Gardens is being arranged and will be an important item in the entertainment program. Among other features to be shown will be an old Italian Herb Garden. St. Louis is justly proud of its world-famous Botanical Garden.

Take the whole week off, doctor, and spend it in St. Louis. It will be time well spent. You may lose a patient, some may get well during your absence, but your increased vigor when you get back will abundantly make up for any losses. Come to our party for one full week.

Dr. C. E. Burford, 3525 Pine St., is Chairman of the Entertainment Committee.

ANNUAL MEETING OF THE AMERICAN ACADEMY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY

MINNEAPOLIS AND ST. PAUL

September 18th to 23rd, 1922

The Minnesota Academy of Ophthalmology and Oto-Laryngology will be the host of the American Academy of Ophthalmology and Oto-Laryngology during the week beginning September 18 to 23, 1922. Headquarters of this meeting is to be at the Radisson Hotel, Minneapolis. Most of the meetings will be held in the Men's Union Building at the University. A smoker is to be held in St. Paul one evening of the week, and a dinner dance is to be held at the Lafayette Club, Lake Minnetonka, some time during the session. The last two days of the session will be de-

voted to an educational course similar to the one held in Philadelphia this fall.

The local committees appointed for the coming meeting are:

LOCAL COMMITTEE

| | | |
|---|---------------------|---------------|
| Dr. Horace Newhart, Minneapolis | - - | Chairman |
| Dr. Carl L. Larsen, St. Paul | - - | Vice-Chairman |
| Dr. John H. Morse, Minneapolis | - - | Secretary |
| President Lotus D. Coffman, University of Minnesota | - - | Ex-Officio |
| Dean E. P. Lyon, Dean, University of Minnesota | - - | Ex-Officio |
| Medical School | - - | Ex-Officio |
| Dr. W. L. Benedict | Dr. W. R. Murray | |
| Dr. F. E. Burch | Dr. L. A. Nelson | |
| Dr. J. F. Fulton | Dr. Arthur E. Smith | |
| Dr. J. D. Lewis | Dr. E. S. Strout | |
| Dr. Thomas McDavitt | Dr. J. A. Watson | |
| Dr. J. S. Macnie | Dr. J. S. White | |
| Dr. H. McI. Morton | | |

SUB-COMMITTEES

| | | |
|---------------------------------|-------|----------|
| Finance—Dr. E. S. Strout | - - - | Chairman |
| Reception—Dr. H. McI. Morton | - - - | Chairman |
| Entertainment—Dr. J. D. Lewis | - - - | Chairman |
| Publicity—Dr. Arthur E. Smith | - - - | Chairman |
| Meeting Places—Dr. W. R. Murray | - - - | Chairman |

MINNESOTA ACADEMY OF OPHTHALMOLOGY

The Minnesota Academy of Ophthalmology and Otolaryngology gave a dinner on the evening of April 12th at the Minneapolis Club in honor of the physicians attending Minneapolis Clinic Week. Dr. Carl L. Larsen presided. Following the dinner, which was attended by fifty-three members and guests, a Symposium on Mastoiditis was given as follows:

1. The Surgical Anatomy of the Temporal Bone—Dr. J. S. Reynolds.
2. The Diagnosis and Treatment of Acute Mastoiditis—Dr. F. J. Pratt.
3. The Management of Complications following Mastoidectomy—Dr. J. D. Lewis.
4. The Etiology and Pathology of Chronic Mastoiditis—Dr. Douglas Wood.
5. The Indications for the Radical Mastoid Operation—Dr. E. S. Strout.
6. The Technique of the Radical Mastoid Operation—Dr. Horace Newhart.
7. Discussion—Dr. J. S. Macnie, Dr. J. G. Ericson, Dr. J. A. Watson.

It was announced that Dr. Fuchs, of Vienna, will arrive in the Twin Cities on May 29, to give a series of lectures on the Pathology of the Eye, for one week. These lectures will be given at some hour late in the day, at some convenient meeting place and will consist of talks upon chosen subjects of one and one-half to two hours each. The cost of the course is \$25.00 per man. Consultation work at which men of the Northwest may call in Dr. Fuchs for his opinion in selected cases is requested. Dr. Horace Newhart is the chairman of the committee arranging for Dr. Fuchs' visit.

JOHN H. MORSE, Secretary.

SOUTHERN MINNESOTA MEDICAL ASSOCIATION MID-SUMMER MEETING

June 19 and 20, 1922

ROCHESTER, MINNESOTA

OFFICERS

| | | |
|-------------------------------|-------|---------------------|
| Dr. W. F. Braasch, Rochester | | President |
| Dr. W. H. Condit, Minneapolis | | 1st Vice President |
| Dr. G. H. Luedtke, Fairmont | | 2nd Vice President |
| Dr. H. T. McGuigan, Red Wing | | Secretary-Treasurer |

Among the speakers from outside of the state who will be guests of the association and will appear on the Scientific Program are:

Dr. W. B. Cannon, Boston, Mass., Dr. Judson Daland, Philadelphia, Pa., Dr. Fred H. Albee, New York City, N. Y., Dr. William B. Coley, New York City, N. Y., Dr. George E. Shambaugh, Chicago, Ill., Dr. Willis Campbell, Memphis, Tenn., Dr. Herman L. Kretschmer, Chicago, Ill., Dr. Preston H. Hickey, Detroit, Mich., Dr. Nathaniel G. Alcock, Iowa City, Ia., Dr. George V. I. Brown, Milwaukee, Wis., Dr. M. C. Seelig, St. Louis, Mo., Dr. George W. Heuer, Cincinnati, O.

The program for the forenoon sessions of Monday, June 19, and Tuesday, June 20, will consist of Surgical and Medical Clinics, and demonstrations in all departments at the following hospitals:

St. Mary's Hospital, Colonial Hospital, Worrell Hospital, Curie Hospital, Olmstead Hospital, Clinic Building.

The program for the afternoon sessions will consist of Scientific Papers, and the Mid-Summer Banquet will be held at the Gymnasium, High School Building, Monday evening, June 19, 1922, at 6:00 p. m.

Make your hotel reservations early by addressing Mr. Roy Watson, chairman Committee of Arrangements, Southern Minnesota Medical Association, Rochester, Minn.

The official program will be published by May 15, 1922.

Attention is called to the importance of securing a certificate when purchasing ticket to Rochester. Said certificate when countersigned by the secretary-general of the association will entitle the holder to half fare return ticket.

COMMITTEES

Program Committee: Dr. H. W. Meyerding, Chairman, Rochester, Dr. J. C. Staley, St. Paul, Dr. B. P. Rosenberry, Winona, Dr. Aaron F. Schmitt, Ex-Officio, Minneapolis, Minn., Secretary-General, 705-707 P. & S. Building.

Executive Committee: Dr. A. W. Adson, Chairman, Rochester, Minn., Dr. A. C. Strachauer, Minneapolis, Minn., Dr. W. J. McCarthy, Madelia, Minn.

Committee on Resolutions: Dr. J. H. Adair, Chairman, Owatonna, Minn., Dr. F. R. Huxley, Faribault, Minn., Dr. C. C. Allen, Austin, Minn.

Committee on Nominations: Dr. M. C. Piper, Chairman, Rochester, Minn., Dr. George Stevens, Byron, Minn., Dr. W. H. Rowe, St. James, Minn.

Committee on New Members: Dr. W. C. Portmann, Chairman, Jackson, Minn., Dr. F. A. Willius, Rochester, Minn., Dr. J. T. Schlesselman, Mankato, Minn.

Committee on Necrology: Dr. J. E. LeClerc, Chairman, Le Sueur, Minn., Dr. G. B. Weiser, New Ulm, Minn., Dr. C. J. Holman, Mankato, Minn.

Committee on Clinical Research: Dr. H. Z. Giffin,

Chairman, Rochester, Minn., Dr. W. H. Valentine, Tracy, Minn., Dr. S. M. White, Minneapolis, Minn.

HOTELS

ROCHESTER, MINNESOTA

1. The Kahler—American—\$5.00 to \$8.00, including meals.
2. Hotel Zumbro—European—\$1.50 to \$4.00, room only.
3. The Damon—European—\$1.50 to \$4.00, room only.
4. Hotel Martin—European—\$1.50 to \$3.50, room only.
5. Hotel Arthur—European—\$1.50 to \$2.25, room only.
6. Hotel Carlton—European—\$1.50 to \$2.50, room only.
7. The Campbell—European—\$1.50 to \$3.00, room only.
8. Cook House—European—\$1.00, \$1.25, \$1.50, \$2.00, room only.
9. Norton Hotel—European—\$1.00, \$1.25, \$1.50, \$2.00, room only.
10. Brown Hotel—American—\$2.50-\$3.50, including meals.
11. Security Hotel—European—\$1.25-\$2.00, room only.
12. Edwards Hotel—European—\$1.25-\$1.75, room only.
13. Northern Hotel—European—\$1.25-\$2.00, room only.
14. Commercial—European—\$1.00 per day, room only.
15. Francis—European—\$1.00-\$1.25, room only.
16. Norman—European—\$1.25-\$1.75, room only.

OF GENERAL INTEREST

Dr. A. E. Henslin has again been elected mayor of Leroy, Minn.

Dr. Henry B. Grimes, of Madelia, was recently elected mayor without opposition.

Dr. Harrington has returned to the Mayo Clinic after a six weeks' trip in Europe.

Dr. Lewis D. Dardiger, formerly of Battle Lake, Minn., has removed to Minneapolis.

Dr. P. D. Carman has been elected an honorary member of the Roentgen Society of London.

The next meeting of the Red River Medical Society will be held at Crookston in September.

Dr. and Mrs. F. N. Hunt, of Fairmont, have returned home from a two months' trip to California.

Dr. S. R. Meaker, Dean of Harvard Graduate School of Medicine, visited the Mayo Foundation last month.

Dr. H. D. Burns and Mrs. Burns, of Albert Lea, have returned home from an extended visit in Southern California.

Dr. Owen W. Parker, of the Shipman Hospital staff, has just returned from a trip to Florida and other parts of the South.

Dr. Otto W. Schlopp, of Hutchinson, Minn., has gone to Vienna, Austria, where he will take post-graduate surgical work.

The Shipman Hospital at Ely, Minn., recently installed a new Bucky-Potter Diaphragm and x-ray table to their x-ray equipment.

Dr. Andrew J. Gilkinson was elected mayor of Osakis, Minn., in March, having a majority of seven over his nearest opponent.

Dr. Geo. E. Putney and Mrs. Putney, of Paynesville, Minn., have returned home after a visit with relatives and friends in Kansas City.

The fellowships will be administered by a special committee known as the Medical Fellowship Board of the National Research Council.

Dr. J. J. McKinnon, of Wadena, sustained a broken leg a few weeks ago in a fall on an icy sidewalk. He is reported as convalescent.

Dr. M. H. Cremer, of Red Wing, accompanied by Mrs. Cremer and daughter have returned from a three weeks' visit in Illinois and Kentucky.

Dr. Clifford I. Oliver and Mrs. Oliver, of Graceville, Minn., have returned home after a vacation lasting several weeks at Excelsior Hot Springs, Mo.

Correspondence concerning the fellowships should be addressed to the Division of Medical Sciences, National Research Council, Washington, D. C.

Dr. Wilson and Dr. Robertson, of Rochester, attended the Conference on Medical Education of the American Medical Association held in Chicago recently.

Dr. R. L. Latchem, who completed his fellowship in Urology, left the Mayo Foundation recently to locate at 532 Davidson Building, Sioux City, Iowa.

The Curtis Northwest Airplane Company has opened an office at the Curtis Hotel in Minneapolis and offers emergency service to members of the profession.

Dr. Henry P. Johnson, of Fairmont, recently visited Chicago to attend the graduating exercises of his son Donald, who had been attending a Medical college in that city.

Dr. Paul W. Aschner, of Mount Sinai Hospital, New York City, presented a paper, "The pathology of lung suppuration" at the meeting of the general staff of the Mayo Clinic.

Dr. Hubert Work, president of the American Medical Association and First Assistant Postmaster General for the past year, has been appointed Postmaster General to succeed Will Hays.

At the January meeting of the Minnesota Academy the following were elected to membership: Drs. J. Felton Hammond and Wallace H. Cole, of St. Paul, and Dr. Angus Morrison, of Minneapolis.

Dr. A. A. Zierold, a former Fellow in surgery in the Mayo Foundation, has established offices at 716 La Salle Building, Minneapolis, Minnesota, for the practice of general surgery and consultation.

Fellows will be at liberty to choose the institutions or universities in which they will work, as well as the men under whose direction they will carry on their researches, subject to the approval of the fellowship board.

Dr. Geo. Goldblum, of Minneapolis, has the distinction of having been robbed recently by a young lady in the company of a hold-up artist. Except for the loss of \$43.00 in currency the doctor escaped uninjured.

Lewisville, Watonwan County, a town on the Omaha road midway between Madelia and Fairmont with a population of 229 (1920 census), is in need of a resident physician. Communications should be addressed to the mayor.

Dr. W. A. Allen, Rochester, Minn., celebrated his 88th birthday March 6, 1922, and it is stated that he is the oldest practicing physician in the state. Dr. Allen began practice in Plainview in 1865 and moved to Rochester in 1872.

Dr. H. H. Hazen, of Washington, D. C., Professor of Dermatology at the George Washington and Georgetown Universities, gave a lecture, "The roentgen-ray treatment of superficial cancer," before the Staff of the Mayo Clinic in March.

Dr. C. H. Mayo delivered the Joyce lecture in neurologic surgery before the Academy of Medicine at Portland, Oregon, and the Jerome Cochran lecture before a meeting of the Medical Association of the State of Alabama at Birmingham.

Dr. B. D. Good, of Biwabik, has been compelled to give up practice temporarily on account of his health. Dr. Good recently suffered a severe attack of influenza which confined him to his bed for several weeks. This has necessitated a long rest.

Dr. James Farrage has disposed of his residence and practice at Winnebago City, Minn., and taken up his residence in California where he expects to make his future home. His practice has been taken over by Dr. J. L. Mills, formerly of Grand Rapids, Minn.

The City Council of Rochester, Minnesota, has voted to take over the Infant Welfare Work, which has been carried on for the last two years. All expenses will be paid by the city and the management has been placed in the hands of the City Health Department.

Dr. and Mrs. W. J. Mayo, Dr. and Mrs. D. C. Balfour, Dr. and Mrs. H. S. Plummer, Dr. Lemon, Mrs. and Mrs. Kahler and their daughter Mary who left Chicago March 4, with Dr. A. J. Ochsner and his party for a month's trip in Mexico, have returned to Rochester.

Dr. E. R. Eisler, formerly of Physicians & Surgeons Building, Minneapolis, has accepted a government position in the St. Elizabeth's Hospital at Washington, D. C. Dr. Eisler has assumed his new duties and is disposing of his office equipment in his former Minneapolis office.

Dr. James F. Lynn, of Waseca, was unanimously endorsed as a candidate for Congress at the First District Democratic convention held at Winona, March 30th. Dr. Lynn is widely known throughout the First District. He will oppose Sydney Anderson who is a candidate for re-election.

Since the principal purpose of establishing these fellowships is to increase the number of competent teachers in the field of medicine, each incumbent will be required to gain experience in teaching. As creative work is regarded as essential to the best teaching, emphasis will also be placed upon research.

The following physicians have recently been elected to membership in the Mayo Foundation Chapter of Sigma Xi, Honorary Scientific Society: Reginald Fitz, Henry F. Helmholtz, Norman M. Keith, Frederick A. Willius, J. Arthur Buchanan, W. Calvert Chaney, Linwood D. Keyser, and Albert J. Scholl, Jr.

The Western Minnesota Hospital at Graceville, Minn., has issued its annual report, of which the management has

reason to be proud. It shows a total number of 1,260 patients admitted during the year and 894 operations performed. There were ten deaths, only 1.1 per cent. The report shows the hospital to be in a flourishing position financially.

The sixth annual clinical session of the American Congress on Internal Medicine held in Rochester, April 3 to 6, was attended by about three hundred physicians and was generally considered a very satisfactory meeting. Dr. Sydney R. Miller of Baltimore, Maryland, was re-elected president, and Dr. H. S. Plummer, of Rochester, was elected first vice-president of the organization.

The Minnesota Supreme Court recently affirmed the Ramsey County District Court in a decision rendered to the effect that where a workman signs a release from benefits he is entitled to, under the Workman's Compensation Act, relying on the advice of a physician that recovery soon will be completed, and further trouble set in as a result of the original injury, he is entitled to further benefits.

To qualify for appointment as a fellow, a candidate must have the degree of doctor of medicine or doctor of philosophy from an approved university, or preparation equivalent to that represented by one of these degrees. Only citizens of the United States or Canada will ordinarily be appointed, although the fellowship board is authorized to set aside this provision in exceptional cases. The fellowships will be open to both sexes.

Virulent smallpox was recently reported in epidemic form from Missouri following closely upon the convention of the American Legion in Kansas City. The inference is that undetected smallpox was imported in unrecognized form at that time. Outbreaks of this kind mean insufficient vaccination, and continual prodding of the public, urging vaccination, is necessary in the absence of compulsory vaccination legislation.

Appointments are to be made for a period of twelve months, beginning at any time in the year, with an allowance of six weeks for vacation. The time may be extended, however, if in the judgment of the board the work which the fellow has done justifies it. The stipends are not definitely fixed in amount; but they are intended to enable the individual to live comfortably while carrying on his special work as a fellow.

The National Research Council announces the establishment of Fellowships in Medicine created for the purpose of increasing the supply of thoroughly qualified teachers in medicine in both clinical and laboratory subjects and in both curative and preventive aspects. The fellowships are supported by appropriations of the Rockefeller Foundation and the General Education Board amounting in total to one hundred thousand dollars a year for a period of five years. Those receiving awards will be known as Fellows in Medicine of the National Research Council.

About 15,000 bills and resolutions have been introduced in Congress to date. Approximately 13,000 of these were introduced in the first session. Of them, 81 House bills and resolutions were enacted into law, while 66 Senate bills and resolutions became laws. In the second session 60 House bills and resolutions have been passed and approved and 28 Senate bills and resolutions are now laws. Of this number only a half dozen or so have been concerned with public

health. These included the Maternity and Infancy Act, the Veterans' Bureau Act, the Act Supplemental to National Prohibition, continuance of the Interdepartment Social Hygiene Board, a post office cancellation stamp for the Cincinnati Health Exposition and an act providing tobacco for hospital patients.

THE UNITED STATES VETERANS' BUREAU IS:

1. Paying out over \$1,000,000 in cash every day, including Sunday, *directly* into the hands of the ex-service man or his dependents;

2. Providing, without cost, hospital care and treatment to 30,000 veterans. This care includes board and lodging and represents an expenditure by the government of \$60,000,000 per annum;

3. Giving vocational training, without cost, to over one hundred thousand disabled ex-service men at an expenditure for tuition and supervision of \$30,000,000 per annum;

4. Mailing out six hundred and fifty thousand checks every month, representing \$42,000,000;

5. Conducting an insurance business for over six hundred thousand ex-service men without any cost of administration to them. Insurance in force: Three and one-half billions;

6. Conducting over fifty thousand medical examinations every month;

7. Giving outside treatment in cases where hospitalization is not required to twenty thousand ex-service men every month;

8. Receiving one thousand new claims every day, in addition to the million two hundred thousand already on file; employing four thousand ex-service men and women in carrying out the work;

9. Requiring for 1922 expenditures in behalf of the disabled ex-service man; \$510,000,000—more than the entire expenditure of the whole United States in 1897;

10. The United States of America is already doing more for its disabled veterans than any country in the world, despite the fact that their losses were far heavier than ours.

11. Do these facts indicate that the disabled ex-service man is being neglected?

Dr. C. L. Scofield, Benson, and Dr. S. Marx White, of Minneapolis, both members of the State Board of Health, have been appointed by Governor Preus, members of the State Advisory Commission of the Minnesota Sanatorium for Consumptives. This Advisory Committee approves and supervises County Sanatoria receiving state aid. Recently resolutions were passed recommending to the Veterans Bureau the appropriation of funds sufficient for the construction of additions to the State Sanatorium at Walker.

NEW AND NON-OFFICIAL REMEDIES

During March the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

The Intra Products Co.:

Sterile Suspension Mercury Salicylate in Cacao Butter.

Sterile Suspension Mercury Salicylate in Olive Oil.

Meadows Oil and Chemical Corp.:

Ammonium Ichthyolate-Meadows.

PROPAGANDA FOR REFORM

Another Remonstrance Against Mercury Inhalation.—During the last few years the attention of the medical profession has been directed by clever propagandists to the treatment of syphilis by procedures which involve the volatilization of mercury-containing mixtures by heat and the inhalation of the resulting volatile products. There is nothing novel in the principles concerned. Inhalations as well as fumigations of mercury have been tested at various times and the procedures have been abandoned because of the uncertain dosage. The Council on Pharmacy and Chemistry has refused to endorse preparations proposed for the treatment of syphilis which depended essentially on the administration of mercury by inhalation (Spiroicide Not Admitted to N. N. R.). In this decision it is sustained by a reinvestigation of the inhalation treatment of syphilis carried out by Cole, Gericke and Sollmann. The investigators point out that the assumption that mercury is more promptly absorbed by the lungs was based on physical misconceptions. In fact, the mercury is condensed on the mucous membranes of the mouth, pharynx and respiratory tract. That in the mouth and pharynx is, for the most part, swallowed; and the absorption then takes place by the gradual conversion of the mercury into soluble compounds. In other words, the administration of mercury compounds by inhalation has no advantage over oral administration. It has the serious disadvantage of indefinite dosage (Jour. A. M. A., March 4, 1922, p. 654).

Collosols (British Colloids, Ltd.).—Collosols is the trade name applied to certain alleged colloidal preparations of drugs made in the Crookes Laboratories by British Colloids, Ltd., London. The Collosols are recommended for external, internal, intramuscular and intravenous administration. A few years ago the Council on Pharmacy and Chemistry investigated the Collosol products and found that some of the specimens contained precipitates and thus they were not colloidal. Commenting on the presence of precipitates, the Council pointed out that if "injected intravenously as directed, death might result, making the physician morally, if not legally, liable." In the cases in which the therapeutic claims for Collosols were examined, the claims were found to be either exceedingly improbable or exaggerated. In the Collosol "literature" there are frequent references to enthusiastic reports by Sir Malcolm Morris, K.C.V.O., F.R.C.S.E. This medical knight seems to have devoted his energies to the exploitation of Collosols and is reported to be one of the directors of the Collosol concern (Jour. A. M. A., March 4, 1922, p. 674).

Hale's Epileptic Relief.—According to advertisements in certain cheap weeklies, Hale's Epileptic Relief is "prescribed by the best New York specialists." These advertisements offer to send a \$1.50 bottle free. Those who answer the advertisement receive a 4-ounce (118.4 cubic centimeter) bottle of a brown liquid and a small package of tablets, also a sample box of Hale's Liver Tablets. The American Medical Association Chemical Laboratory analyzed these preparations, and reported that the preparations give tests for ammonium, sodium, potassium and bromides, and that the bromid content is equivalent to 20.73 gm. of potassium bromid per hundred c.c. The tablets were found to contain emodin bearing (laxative) drugs—possibly aloes (Jour. A. M. A., March 4, 1922, p. 672).

Our Knowledge of Vitamins.—It is generally accepted that a well-balanced diet provides the individual with such vitamins as are necessary to maintain growth and nutrition. The *British Medical Journal* in a leading editorial reiterates the statement that an abundant supply of vitamins exists in all fresh vegetables and that a considerable quantity occurs in milk and meat, provided the latter substances are obtained from animals fed on fresh foods. A normal adult living on an ordinary diet containing a reasonable proportion of fresh vegetables is, therefore, certain of obtaining a plentiful supply of vitamins. Of all the mass of evidence which has accumulated relative to these substances, this fact is the point of greatest importance. It is, however, very unfortunately, the one point which those commercially inclined are unwilling to recognize (*Jour. A. M. A.*, March 11, 1922, p. 734).

Pulvane.—In a twelve-page pamphlet, sent out by the Pulvane Laboratories, Inc., Des Moines, Iowa, and purporting to deal with "The Therapy of Pulvane, an Advanced Method for the Treatment of Respiratory Diseases," we are told that Pulvane "was developed in a United States Army General Hospital by officers of the Medical Department." Pulvane is administered by inhalation, at the offices of the Pulvane Laboratories, Inc. Its "discoverer," it is declared, chanced on the method of "introducing into solution and volatilizing a certain germicide, extremely rare in its usage, because of its resistance, heretofore, to attempts to bend it to scientific will." This "rare" medicament is alpha naphthol. But since the discovery of this volatilizing method "three other ingredients of high therapeutic value have been added." It is stated that the "medical directors" will be glad to name every ingredient of Pulvane to any reputable member of the profession. Nothing is said about disclosing the amount of the ingredients of Pulvane and hence the information offered is no more complete than that furnished for such patent medicines as Peruna. With regard to the claim that Pulvane was "developed in a United States Army General Hospital by officers of the Medical Department," Surgeon-General Ireland, of the United States Army, announces that the Medical Department of the Army had nothing whatever to do with the matter and that it thoroughly disapproves of the methods of the promoters of the concern (*Jour. A. M. A.*, March 11, 1922, p. 750).

Warn's Epilepsy Treatment.—The claims made for this nostrum are similar to those made for Maghee's Epilepsy Treatment, but they are worded more cautiously. While in the case of the Maghee preparation it is claimed that certain effects WILL be produced, the Warn Remedy Co., avers that these effects SHOULD be produced by the preparation. The *A. M. A.* Chemical Laboratory reports that Warn's Epilepsy Treatment consists of capsules, each containing approximately 0.06 gm. (1 grain) of phenobarbital (luminal) to which has been added some charcoal and that it differs but slightly (by absence of bismuth subnitrate) from Maghee's Epilepsy Treatment analyzed previously (*Jour. A. M. A.*, March 18, 1922, p. 834).

The Future Independence and Progress of American Medicine in the Age of Chemistry.—The recent war brought about a realization of how dependent we had been on Germany for our most valuable drugs. However, before the war was over, American manufacturers were making adequate supplies of urgently needed drugs. In their work on war gases chemists had an example of what could be

accomplished in an almost incredibly short time, when facilities for research were provided on a large scale and under conditions allowing of the fullest co-operation of chemists, physicists and physicians. With the close of the war, chemists began to consider to what extent such facilities might bring about American independence in drugs. A committee appointed by the American Chemical Society has now issued a report which elucidates the subject. The report makes it clear that pharmacologic research in German universities and in privately endowed institutes are far ahead of those in the United States. Our schools of medicine and hygiene, the report continues, are largely ignoring the services which pharmacology, in close co-operation with chemists and clinicians can render to hygiene and preventive medicine. About twenty years ago, Congress established the Hygienic Laboratory of the U. S. Public Health Service; the plan of its organization was unsurpassed by that of any laboratory in the world; but since then Congress has failed to provide for any considerable growth of this laboratory. Enlarged and with adequate support, this laboratory could give the United States the leading place in the world in this great scientific and humanitarian endeavor toward the discovery of new drugs. If better government support of the Hygienic Laboratory cannot be secured, then a privately endowed research institute must be the goal of those who realize the vast benefits which will accrue from the proper type of research in drug therapy (*Jour. A. M. A.*, March 18, 1922, p. 806).

The Demand for Vitamins.—Ordinary fresh foods are the simplest, cheapest and richest sources of vitamins, yet vitamin "concentrates" are being "demanded" by the public because shrewd, forward-looking "patent medicine" exploiters are using all the subtle art of modern advertising to convince the public that it is in serious danger of vitamin starvation, and that the only hope lies in buying these alleged concentrates to make up a hypothetical deficiency. Advertising campaigns, such as these of the vitamins constitute a vicious circle; an artificial demand is created and then the manufacturer excuses his business on the ground that he is merely supplying a demand (*Jour. A. M. A.*, March 18, 1922, p. 810).

Veratrum Viride in Pneumonia.—Medical opinion is averse to the routine use of *veratrum viride* in the treatment of uncomplicated pneumonia. Claims made for the use of *veratrum viride* are advanced for other drugs, none of which have borne critical investigation. The error on the part of those who make these claims is the result of inadequate control observations. Advocates of *veratrum viride*, aconite and venesection believe that by the depression of the circulation produced by the treatment they may lessen the extravasation of blood into the air vesicles and to this degree lessen the involvement of the lungs. The lack of demonstrable success of venesection has led to the discarding of this once almost universally employed mode of treatment of pneumonia. It is unreasonable to expect as much or more from aconite or *veratrum* than from venesection (*Jour. A. M. A.*, March 18, 1922, p. 835).

Albert Abrams, A.M., M.D., LL.D., F.R.M.S. — Dr. Abrams has published a book on "Spondylotherapy" ("Physio-Therapy of the Spine"). Spondylotherapy is stated to concern itself "only with the excitation of the functional centers of the spinal cord." Between 1912 and 1914 Dr. Abrams gave "clinical courses" on "Spondylotherapy."

erapy" in various parts of this country. More recently Dr. Abrams had advertised that he gives a "course" in "Spondylotherapy" in San Francisco. In addition to "Spondylotherapy," Dr. Abrams has also evolved what he calls the "Electronic Reactions of Abrams" which are said to make possible long-distance diagnosis, it being necessary only to send a few drops of blood taken from the patient and allowed to dry on a slide. Dr. Abrams founded and edits "Physico-Clinical Medicine," a quarterly "devoted to the study of the Electronic Reactions of Abrams . . ." What seems to be the outstanding piece of apparatus, devised or invented by Dr. Abrams, of physioclinical diagnosis and treatment is the "Oscilloclast." All one needs to do, according to Dr. Abrams, is to ascertain the "vibration rate of a drug" and then to substitute the same vibration as produced by the "Oscilloclast." More recently, Dr. Abrams has extended his observations and experiments, using what apparently is a modification of the old-fashioned pith ball suspended by a silk thread from a rubber rod. This device he calls the "Electrobioscope." If there is any scientific foundation for the marvels that Dr. Abrams so picturesquely features, the scientific world has not yet found it out (Jour. A. M. A., March 25, 1922, p. 913).

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of March 8, 1922.

Dr. H. L. STAPLES presiding.

Dr. C. EUGENE RIGGS presented the following case:

Case of Suppressed Complex. Miss A., aged 21 years; father died of pneumonia in 48th year; mother now in 47th year and well; usual childhood infections; matured at 13 years; never strong, but no serious illnesses. Has been in two bad automobile accidents but escaped injury. Her menstruation has been very irregular, varying from three to six times a year, and since October, 1920, she has not menstruated at all. Mother and sister have shown similar irregularities. The former has been regular since the birth of her first child. In 1919, Miss A. had a most distressing experience while waiting for a car in a large city. A degenerate, finding her alone, made a most disgusting show of exhibitionism; a short time afterward she was held up at the point of a revolver and robbed. After these experiences she became very nervous and complained of rapid heart action. The nervousness steadily increased. Before the first experience she never knew what fear was. Since, especially of late, she has been unable to go to bed without looking into the closets and under the bed; indeed, she cannot sleep until she has investigated the whole house. She is troubled with "wild dreams," is always being accosted by someone, and someone is breaking into the house, and in her dreams she is always in great danger and is unable to help herself. "For the past six weeks," states her physician, "she has been in bed most of the time; she has lost weight and her hemoglobin has decreased. She also has from four to eight fainting spells daily. There is a premonition of their coming; this is followed by tachycardia; the face is pale; the finger-nails are not

cyanosed; the attacks have steadily increased in severity and the patient has gradually become weaker."

The neurological examination was negative; the metabolic rate was plus 11.8 per cent; hemoglobin, 86 per cent; r. b. c., 4,640,000; w. b. c., 7,300; number of cells counted, 200; p. m. n., 60 per cent; lymph, 35 per cent; large monos., 3 per cent; trans., 1 per cent; eosin, 1 per cent; urine, *normal.

Dr. Rothrock, who examined the pelvic organs, reported as follows: "I have examined Miss A. and find the uterus normally developed, in good position, freely movable. The right ovary can be felt slightly prolapsed but apparently free from adhesions, and of normal size. Ovary on the left side can be felt; could not be palpated. So far as the pelvic organs are concerned, there is nothing abnormal to be discovered, so that it is probable that her amenorrhea is functional and is probably dependent upon some disturbance of the balance of the internal sections. It would appear that this is but one of the symptoms of the clinical syndrome."

Observation made in clear that the "fainting" attacks were neither of epileptic nor of hysterical character, but were dependent upon the psychic insult she received in the first experience referred to. This she kept to herself and has never mentioned to anyone until she related the experience to me. Evidently this distressing complex was the cause of her nervous symptoms and offered a satisfactory explanation of her illness. The endocrine factor is an epiphenomenon; its familial character is most interesting and undoubtedly had been influenced by the stress and strain through which she has passed. Immediately after I explained to her the psychology of her trouble the attacks ceased; her stay at the hospital was short. At present she is in excellent health and enjoying her work.

This is an instance where one must consider, as Patrick says, "the patient above the eyebrows." During the earlier interviews she made no reference to her distressing experience. She stated that life had been uneventful—that of a happy, care-free young woman. The complex was suppressed, not dissociated. Disorders of personality usually arise in either of two ways:

- (a) Inability of patient to adjust himself to his environment.
- (b) The effect of the complex suppressed or disordered on the subconscious.

Shell-shock and the neuroses of civil life illustrate the former, while this case is an excellent example of the latter. The existence of conserved experiences outside the domain of personal consciousness—the subconscious—a purely philosophical concept, was first postulated by Kant and Hartmann. These experiences not in awareness with personal consciousness were not supposed to bear any relation to life or conduct. Later it was demonstrated by Janet of France and Gurney of England "that dissociation with the formation of subconscious processes motivated by their own emotional impulsive force take on autonomous action and induce physiologic and psychologic phenomena" (Prince); and to these subconscious processes rather than personal consciousness personality is believed to be due. They shape our beliefs, our ideals, our character. From them arise the bizarre delusions and hallucinations of the insane; the syndromes of hysteria, psychasthenia and the

various complexes incident to abnormal psychology. Search for the determinants—the complexes—is a grievous and time-consuming process, but amply repays the effort. In our investigation of functional causes and mechanisms we must not forget that Neurology consists of much more than aberrations of personality. Differing radically as we do as to the factors, mechanisms and process which give rise to the psychotic individual, yet we must all agree that the explanations of the latter can only be found in the conflicts, impulses and reactions of human personality. (Prince.) I certainly believe in the theory of the sub-conscious; as a working hypothesis it augurs well; mental conflicts and repression are dynamic factors, everywhere in evidence. Frank suggestion without careful investigation of the psychic factors at play, as in Christian Science, faith cure, osteopathy, etc., sometimes results in recovery, and to this and the indifference of medical men to functional nervous diseases is the popularity of the cults due. In dealing with human credulity and the urge of the mystic which we find in our patients—their fads, their eccentricities, their fancies—we must not forget that skilful psychological handling is the crux of the whole matter. May I recall to you the legend of Greek Mythology—that the Titans, children of Earth and Heaven, warred with the gods and were cast bound into the Gulf of Tartarus where, lying prostrate, they became restive and shook their bonds and doing so caused the earth to tremble. When the earth trembles, remember the Titans.

DR. E. L. TUOHY, of Duluth, presented the following cases:

Three cases of "Mesenteric Embolism with Resultant Thrombosis of Mesenteric and Intestinal Arteries, Associated with Myocardial Disease."

I wish to report and place on record three instances of this pathological sequence in cases observed for some time suffering from myocardial insufficiency or degeneration.

Gerhardt in 1863, and Kussmaul in 1864, first drew attention to the clinical findings associated with this phenomenon. Much experimental work done by Welch, Mall, and others, gives the degree of interference that the main branches of the superior mesenteric artery will tolerate without bowel gangrene. The inferior mesenteric artery seems not to be affected as does the superior, which supplies all of the small bowel except the upper third of the duodenum and one-half of the lower bowel. The superior mesenteric comes off at a relatively high level, closely associated with the celiac axis, and is an artery of relatively large size, no doubt predisposing it to the collection of emboli. Like the coronary, gradual occlusion, if occurring slowly enough, may give time for compensatory relief. But it is generally agreed that rapid complete occlusion of this artery or any of its chief branches is always followed by hemorrhagic infarction of a lesser or greater segment of the intestine.

The chief clinical signs are the manifest evidence of intestinal obstruction, the passage of stool material (if at all) blood tinged, and the usual vomiting of fecal material, often bloody. Unless surgical relief can be promptly available, death is certain. The surgical mortality, when mentioned at all, is said to be as high as 92 per cent; only one-sixth of the cases is said to be feasible from the standpoint of resection. The outlook is made doubly bad,

not only on account of the infectious and toxic phenomena incident to any bowel obstruction, but also on account of the very severe cardiac condition usually precipitating this abdominal catastrophe.

CASE 1. Male. C. D. Age 37. Weight about 220 pounds. Was under care for auricular fibrillation and myocardial insufficiency with general anasarca. He had in the beginning, severe dyspnea, cough, with râles at the bases of both lungs, and was thoroughly uncomfortable. There was in the beginning, before any digitalization, a pulse deficit of 70. After about four weeks' observation and rest he became quite comfortable and was up and about. Then suddenly he had a very severe abdominal colic, with the vomiting of fecal material, latter becoming bloody. Enemas brought down some scanty material that was blood-stained and contained mucus. He passed rapidly into a very critical condition.

Under a local anesthetic the abdomen was opened, where 10 to 12 inches of black, gangrenous small bowel was found. The bowel was greatly dilated. The mesentery was also gangrenous. Tubes were passed into the bowel each way, after sewing it to the belly wall. Patient succumbed within a few hours—about twelve hours after the beginning of his attack.

CASE 2. Male. N. J. Age 63. Was under observation for myocardial degeneration. He showed occasional short periods of distinct splitting of the first tone of the heart (suggesting branch bundle block). He had a curious interlobular hydrothorax. He showed only a moderate improvement under rest and general supportive treatment. Suddenly, about two months after he was first observed, he developed a severe abdominal colic, vomiting the same kind of bloody material as was found in the first patient. He developed later a persistent hiccough, and passed rapidly into collapse, and died within sixteen hours of the development of his intestinal symptoms.

CASE 3. Female. Age 65. Originally suffering from obesity and essential hypertension, had been under observation for a period of six years. Gradually, with the evidence of a failure of her myocardium, she developed mental aberrations, but the kidney function, frequently observed, remained well sustained. While the possibility of sending her to a sanitarium for nervous cases was being considered, on account of her mental state, and while she was entirely free from any bowel discomfort, she also developed the same sudden, excruciating abdominal pain, and vomited bloody fecal material. Persistent effort with enemas from below gave no relief whatever. She died within five hours after the onset of her abdominal pain; in fact, while being moved into the operating room for an attempted operative regime.

COMMENT: It will be seen that all these cases passed into collapse and died extraordinarily promptly. While only one abdomen was opened, and thus confirmation of the diagnosis made available, there is no good reason to doubt the authenticity of the other two cases. It has been sometimes stated that during digitalization of failing hearts, emboli and infarction are possible, and sometimes imminent, dangers. One of these cases had evidences of heart block, and digitalis was not relied upon at all; only in one case had digitalis been used to the point of securing its effect. In that patient the mesenteric embolus occurred at a time when he had been restored to fair compensation,

and we would not have in mind the possibility of whipping up and distributing the clots that had accumulated during the period of his high pulse deficit. I feel that this condition must occur oftener than the literature would lead us to suspect. It is quite possible that this condition sometimes masquerades under the diagnosis of an ordinary intestinal obstruction, or, more rarely, might be misinterpreted as an uremic evidence in patients with failing hearts who are rather prone to show albumin in the urine.

In addition to these cases I would like to present a case and show one slide in connection with a curious disease, and would like to ask if any of the members present have seen anything like it. It is a case of Milroy's disease.



Milroy's disease, Meige's disease, or hereditary tropho-edema, was first described in this country by Milroy in 1892, and later by Meige of Paris in 1899. Case reports of this rare condition have been few, the most noteworthy contribution being that of Hope and French in 1908 in the *Quarterly Journal of Medicine*.

The condition belongs to the tropho-neuroses, affecting the vaso-permeability, and therefore may be allied to angioneurotic edema and the acute circumscribed edema of Quincke. The condition is frequently found in association with other tropho-neuroses such as urticaria, intermittent hydrarthrosis and angioneurotic edema. It is essentially chronic, begins congenitally or in early life, and has little tendency to shorten life, one patient living to the age of 83. The edema is chronic, affecting the extremities usually unilaterally at first, and sometimes eventually becoming bilateral. It is more common in the lower extremities and, in its development, characterized by the fact that it begins usually about the ankle without any dependent edema in the foot. After a varying period of time the edema seems

to ascend rapidly to the knee, and again later on to the hip, beyond which point it does not go. The edematous limb is generally pale, but may be cyanotic or hyperemic. There is pitting on pressure, but the consistency is much firmer than in ordinary edema. Usually a mild state of elephantiasis is reached. The familial tendency is characteristic, and without it the diagnosis is questionable. In the cases reported by Hope and French, eight were afflicted in a single family. Another striking characteristic found in the condition is periodic attacks of fever, accompanied by vomiting, diarrhea, epigastric distress, and a marked hyperemia of the affected limb simulating erysipelas. These attacks may occur quite frequently and suggest the paroxysmal seizures of Quincke and Raynaud's disease, but similar seizures occur in filarial elephantiasis, so it is not characteristic of a tropho-neurotic condition. Unless the following criteria are fulfilled, the diagnosis of Milroy's disease should not be made:

(a) The absence of all recognized causes of edema outside the nervous system.

(b) Its extreme chronicity, the affection dating sometimes from birth and lasting for the remainder of life at whatever period it starts.

(c) The sharply-defined boundary of the swelling and the tendency to affect segments of limbs rather than to follow the law of gravity as in ordinary edema. For example, the leg may be grossly diseased and the foot almost normal.

(d) The tendency to produce a hyperplasia of the skin and subcutaneous tissues of the part affected.

(e) The familial and hereditary character of the complaint, and its association either in the affected individual or in other members of the family with other neuroses.

The case I wish to present is Mrs. W. R., Canadian born, aged 50, married, and by occupation a housewife.

The patient has had no children, and had one miscarriage.

Family History: Father died of pneumonia. Mother died of heart disease, and had from about the time of puberty the same condition in her leg which this patient presents. Several brothers and sisters are living and well. One sister died of some obscure lung disease. One cousin similarly has the same condition as the patient's mother and the patient herself.

Menses: Patient's menstruation ceased at the age of 45, uneventfully, and without any recurrence since that time.

Past History: Patient has always been well, with the exception of the presenting condition, and for the fact that in 1920 she on two occasions had fever with vomiting, gastric distress which lasted several days, with severe chills, and accompanied by a marked redness of the legs.

Present Complaint: Patient now complains of marked swelling of the left leg from the groin to the ankle, slowly progressive, beginning at the age of 18, before she was married, without any antecedent history of infection, and gradually progressing from the ankle upward to the groin. The condition has been unaccompanied by pain, but in the past year the patient has noticed a similar tendency to swelling about the right ankle. At one time a superficial wound of the left leg resulted in the transudation of serum for about two weeks, but benign healing soon followed. Patient's general symptoms were negative.

Physical Findings: On examination the following data were elicited: Temperature, 97; hemoglobin, 80; red blood count, 3,750,000; white blood count, 8,000. Catheterized urine negative (chemically and microscopically). The patient had a distinct pallor, suggesting the anemic condition, verified by the blood picture. Examination of the head and neck was negative, with the exception of mildly infected tonsils. Examination of the chest, including the heart and lungs, was negative. Examination of abdomen negative. Pelvic examination showed a small uterus, without fixation and any evidence of deformity in the adnexa. The upper extremities were normal. The left leg showed a rather uniform, pale swelling, from the ankle to the groin, not involving the foot appreciably, which did not pit very easily on pressure and seemed to be hard in consistency. Examination of the other leg showed only a beginning edema about the ankle and slightly above that point.

Diagnosis is based on the fulfillment of the criteria outlined by Turney:

1. The absence of any cause for the edema outside the nervous system.
2. The chronicity.
3. The sharply-defined boundary, with the absence of edema in the foot.
4. The hyperplastic skin and subcutaneous tissue.
5. The familial and hereditary tendency.
6. The exacerbations of fever, redness, chills, and epigastric distress.

Discussion by

DR. A. W. ABBOTT: About 15 years ago I had one of these cases and did not know what it was. Did not know, in fact, until just now. I remember the case very well and it answered the description of Dr. Tuohy's case perfectly. The disease was confined to the space below the knee and above the ankle. There was no other case in the family. I suppose it has to begin with some member of a family. This boy, who was about 10 years of age, might have been the beginning of a series.

DR. PAUL COOK: We had a boy here during the summer who was 8 or 10 years of age. I think he finally went to the University Hospital. His case was really not a skin condition. His history only went back to an uncle who had the same condition.

DR. S. M. WHITE: Dr. Tuohy speaks about the lack of involvement of the foot, but in this boy of which Dr. Cook speaks the dorsum of the foot on both sides was involved. The parents were free, but an uncle of the boy had the same condition.

An adult case seen about three years ago also had involvement of both legs, but only on one side was there involvement of the foot. That case, on investigation, proved to have an ancestry in which the disease had occurred in at least three generations. In one of those cases it was a decidedly deforming condition. There was an edema about like that in the case given by Dr. Tuohy.

DR. TUOHY: Was there a history of abdominal cramps?

DR. WHITE: In neither of these cases was there a history of abdominal symptoms.

DR. A. C. STRACHAUER: Milroy's disease of the lower extremity without involvement of the foot is, of course, easily diagnosed, but when the foot is involved how would the condition be differentiated from elephantiasis? I am

not referring to Dr. Tuohy's cases, but to the cases cited in the discussion. I fail to see how the differentiation could be made unless there be a familial history and co-existing abdominal symptoms. In elephantiasis of the lower extremity the foot is, of course, always involved, and while pachydermia and skin folds are present in the advanced cases the skin in the early condition may be quite smooth and normal, particularly in the cases of elephantiasis caused by a previous erysipeloid infection, which latter type constitutes the majority of cases seen in this country, the filarial type being most rare.

Regarding the subject of mesenteric thrombosis, as presented by Dr. Tuohy, my personal experience is limited to two cases. The suddenness and severity of the onset of symptoms are similar to those of acute hemorrhagic pancreatitis. It is very evident that a calamity has occurred and it is unwise to waste valuable time in endeavoring to make too refined a diagnosis. The diagnosis of acute surgical abdomen suffices, and the patient should be operated upon as promptly and with as great dispatch as possible. In one case twelve feet of jejunum and ileum were resected and end-to-side anastomosis of the terminal ileum to the anterior wall of the stomach was made. The vitality of the duodenal-jejunal site of resection was so impaired that it had to be closed as a blind end. The patient did very well for three days and then died.

We are carrying on some animal work at the University to ascertain whether the operation of closing the end of the duodenum with a gastrointestinal anastomosis is a feasible one.

In the second case a foot and a half of bowel was resected, and the patient lived for five days.

Surgical treatment is the only possible hope for these cases and must be promptly applied to be of benefit.

DR. COOK: My recollection of Milroy's disease is that it is congenital.

DR. TUOHY: According to the literature this is not true. In this case it did not develop until the patient was 18. It is regarded as a syndrome. The literature pointed out that there was a difference so far as the paroxysmal seizures are concerned. Elephantiasis had to be ruled out on the secondary signs of the disease rather on the appearance of the leg.

DR. E. S. GEIST: Within the last 10 days I have had a case similar to the one Dr. Abbott speaks of—no swelling of the foot, and swelling of the leg between the ankle and the knee. The patient was a woman 35 years of age and the condition followed some infectious disease some 15 years previous. I think it was scarlet fever. It was unilateral, the skin smooth, and there was an edema which was permanent and not relieved by rest in bed. I should like to ask Dr. Tuohy what the literature says about the possible infectious origin of this condition.

DR. TUOHY: The literature leaves the cause of the disease indefinite. Purpuric cases will pass blood in the urine. These pains are due to intestinal cramp due to swelling in the intestine itself. There may be a cause similar to that of angioneurotic edema. Evidently infection is not the chief causation. Food idiosyncrasy or poisoning might be a causative factor. While the literature mentions the fact that the disease may be congenital, it also states that it may come on any time.

Regarding operation for the bowel condition incident to

thrombosis of the superior mesentery, I would say that if we were to look out for it in heart disease cases something might be done, but it comes on so very suddenly that one must act quickly.

Dr. R. E. FARR: Elephantiasis is not always caused by filariasis. Handley has reported a number of instances in which the staphylococcus albus was cultured in subcutaneous fat. I believe that elephantiasis need not be confused with this disease for it becomes more or less permanent when established and we do not have remissions.

Dr. ARCHIBALD MACLAREN reported a case of kidney tumor in a child.

On February 27, Dr. Ramsey, of St. Paul, referred to me a small boy, 18 months old. He had a large smooth elastic tumor in the upper right hypochondriac region. This tumor was first noticed in December, 1921. It was pronounced at once as inoperable and hopeless and was taken to Dr. Owre for x-ray and radium. Dr. Owre gave four radium treatments consisting of 5,400 milligram hours with a one-inch gauze pad between the radium and the skin. The last treatment had been given two weeks before we saw the child. The tumor had steadily increased in size in spite of the radiation. There was no discoloration of the skin over the tumor. The child had gained three pounds in weight in the past two months and looked the picture of health, excepting for the steadily increasing tumor. There had been no other physical findings except blood in the urine, which had been noted on two different occasions. The first time there was considerable blood one day three months ago. The second bleeding was very slight, the urine being markedly pink in color for one day three weeks ago. Aside from the symptoms noted the child was normal in every way.

Because there was some question regarding the advisability of any operation, Dr. A. Schwyzer was asked to see the patient with us. He advised the wisdom of an exploration to determine the character of the tumor.



After removal the tumor mass was sent to Dr. Margaret Warwick, who gave the following pathological report:

"Kidney and tumor mass: A large tumor mass measures 4x4x4 inches. It is entirely encapsulated but the capsule shades imperceptibly into the capsule of the kidney. No adrenal was found. The kidney itself measures 2x2.5 inches. Throughout the cortex are numerous small cysts which measure from 1 to 3 mm. in diameter. In the center of the cortex is a tumor mass similar to the larger one

described above only it is much smaller, measuring 1x1 inch. This projects down into the pelvis of the kidney, but is not connected with the mucosa of the pelvis. The pelvis itself is moderately enlarged and somewhat distorted by the pressure of the larger tumor mass, but otherwise appears normal. The upper pole of the kidney is markedly elongated and fades into the capsule of the larger tumor mass.

"Gross section of these tumor masses shows them to consist of very soft homogenous pink tissue. Microscopic section shows identical structure in both tumors. It consists of various tissue elements. Groups of spindle cells predominate and these show many mitotic figures. In these masses of spindle cells are numerous atypical tubules lined by poorly differentiated epithelial cells showing many mitotic figures. These tubules, however, have definite lumina. There are also areas showing the stellate cells typical of myxomatous tissue. In still other areas there are bundles of smooth muscle tissue. So this must be classified as a mixed or embryonal tumor of the kidney. From the histological picture alone it appears to be of a very malignant type, but the behavior of these tumors cannot be foretold by their cellular appearance, for many do not metastasize, while others, less malignant in appearance, do metastasize.

"Diagnosis: Embryonal adenomyosarcoma (malignant mixed tumor) of kidney."

Discussion by

Dr. A. SCHWYZER: I saw the case before operation and the most striking feature was the large size of the tumor in a little baby 18 months old. The child looked remarkably healthy, playful and well. Another interesting feature was that the tumor was absolutely smooth. It was a condition which would invite surgery and gives us a chance to get a clean removal.

Dr. A. T. MANN: These tumors of the kidney are very interesting. Pathologists have a good deal of difficulty in uniting as to just what they are. But the point I arise for is the question of radium. As I understand it, radium is really most effective within a distance of one inch and beyond that distance its rays penetrate rather sparsely and while they may go to a considerable distance there is not very much power to them. Also the dosage would vary with the intensity of that ray. With an application of radium to such a deep tumor the portions near the radium would receive a degenerative dose and the cells would be destroyed; in the next zone beyond this the cells would receive a sterilizing dose and while they would be able to live they would lose their power to reproduce; and in the zone beyond this the cells would receive a stimulating dose, making them grow more rapidly. It strikes me that this is not a proper case to use radium on. In the first place a small amount of radium is a stimulating dose, i.e., stimulates the cells to grow. A larger dose is a sterilizing dose. Where radium is used for a longer time it helps the tumor to degenerate, but in tumors of this kind I believe it should not be used.

Dr. H. B. SWEETSER: I ask about the pathology of this. Pathology seems to bear out that this is a mixed tumor of children. About four years ago I took one out of a child 8 years old. I was astonished to find how easily it came out. The child was out in a short time. I gave the tumor to Dr. Bell, who pronounced it a mixed tumor of children

and said that the child would not live over eighteen months. This child lived over a year and died in about fifteen months, I think. Some man in New York reported that all of his cases were in young children. One young lady lived for three or four years. I have not seen tumors like that in children who did not die. The prognosis is almost absolutely fatal.

DR. MACLAREN: It seems to me that when we have a case like this we are justified in operating if for no other reason than that we may determine the absolute character of the growth. Suppose we could not entirely remove the growth. Then the proper thing to do would be to put the radium right into the tumor. Dr. Ramsey says he has one case still well after three years. But even if we can give them only one or two years, I think that that is worth while, for all that we are doing as physicians and surgeons is to prolong life a short time.

DR. A. W. ABBOTT reported a case of pregnancy without a corpus luteum.

Mrs. C., first seen January 17, 1922. Age, 27 years. One child 8 months old. Menses began in July after confinement. Menstruated regularly to November 18. Then flowed profusely; no pain. December 15, slight flow followed by yellow discharge with some odor for four days. No flow in January, but pain and tenderness in right pelvis. Sharp pains at intervals; no violent pains. Other general conditions normal except hemoglobin 58 per cent. Uterus in normal position, large. Soft cervix. Indefinite tender mass in right pelvis. At this time the diagnosis was possible unruptured ectopic pregnancy. January 20, swelling and tenderness slightly less. January 28, swelling increased with great tenderness, pains continuing. January 29, a median exploratory incision made. In the right pelvis was an impacted ovarian cyst, thick-walled and containing a slightly tinged content. Left ovary was decidedly smaller than normal, either atrophic or never fully developed. No corpus luteum could be found in either ovary after most careful examination. Microscopic examination of the ovary shows the usual decadent corpora lutea of menstruation. The cyst wall shows no evidence that the cyst was ever a corpus luteum. Uterus was the size of a two months' pregnancy. February 9 and March 1 the patient was re-examined. Uterus still increasing in size with every indication of pregnancy.

This case is presented with the specimen of the right ovary removed at the operation because it is taught that in pregnancy the corpus luteum peculiar to that period is always manifest. In this case there is either a mistake in the diagnosis of pregnancy or else this must be a rare exception to the rule. If this proves to be a normal pregnancy, the absence of the corpus luteum of pregnancy cannot be positively depended on as a deciding factor in differentiating a soft uterine tumor from a pregnancy.

DR. W. H. MAGIE, of Duluth, read a thesis entitled, "Some Experiences with Fractures," and gave a lantern slide demonstration.

Discussions by:

DR. H. J. O'BRIEN: Dr. Magie's paper is most interesting. I was glad to hear the Doctor say that he sometimes uses Lane plates in bone surgery. Nothing has been more abused, both in literature and practice, than the Lane plate and yet in properly selected cases, in competent hands, it

is one of the most reliable methods of obtaining a union of broken bones.

I was glad to hear Dr. Magie say he does all his work in the Morgan Park Hospital because that releases him from any responsibility of a patient who came in our office today with an injured hand, which had been diagnosed in Duluth in the last ten days as a sprain of the hand. Carrying out the same method that Dr. Magie uses in the Morgan Park Hospital, an x-ray of the hand showed a double closed fracture of the fourth metacarpal bone. Had this patient consulted Dr. Magie he would have had an x-ray examination and the proper diagnosis would have been made.

I haven't had anything like the success Dr. Magie reports in fracture of the spine. In fact, I have had no success at all. Some years ago I developed an enthusiasm for operation on fractured spines and after seven consecutive failures (so far as relief of the patient was concerned) I desisted, thinking I would never operate upon another fractured spine accompanied with immediate paraplegia. Some months after this resolve, I saw a case of fractured spine with immediate paraplegia, in consultation with Dr. Sneve, and it seemed to me a favorable case with some promise of relief if operated upon. So I changed my mind and did a laminectomy, but with only the same results I had obtained in the seven previous cases. I do not think I prolonged any of those patients' lives and am quite sure I made them more uncomfortable because of the increased discomfort of being moved about in the bed for dressings, etc.

I have seen two fracture dislocations of the spine, without pressure on the cord, recover; but I have never seen a fracture of the spine, followed by immediate paraplegia, recover or improve. But a fracture, or even a fracture dislocation of the spine without severance of the cord fibres by spicules and a comparatively slow oncoming of paraplegia from hemorrhagic pressure, may require operation for relief of this pressure and recover.

DR. E. S. GEIST: We must thank Dr. Magie for bringing us these usual cases. I want to congratulate him on the excellent results he obtained in these cases. The field is a very large one and I simply want to emphasize the use of the x-ray in fractures. We still find too many fractures neglected in that way; not x-rayed or not x-rayed enough. The x-rays are not taken at different angles, and the result is that some fractures are often overlooked. In court the value of the x-ray as evidence is very great. I have recently had the unfortunate task of assisting several doctors in malpractice suits. If physicians who have serious fracture cases (and almost all are serious) would call some other physicians in consultation, such lawsuits would not be as frequent.

I wish to speak about only one form of fracture this evening and this is the fracture of the small bones of the foot. I have seen many cases of metatarsal fractures caused by trivial accidents, mis-steps, etc. The importance in correct diagnosis is that these patients should be put at rest. The foot can be walked upon, but excessive walking during the period of healing causes excessive callus formation and this is often followed by a permanently painful foot. The main point is simply to recognize these fractures, and this is most easily done by the x-ray.

DR. A. MACLAREN: We can get a great deal of information from people who have the kind of experience that

Dr. Magie has had; men who have been able to follow their patients to know what the final results are; and they are the people who are best able to tell us when we ought to operate and when not. There have been a great many useless operations in the past few years. That craze is passing now. Occasionally, it is necessary to operate, but the Lane plates can, and usually should, be taken out if they commence to give trouble.

DR. A. T. MANN: I certainly have had a great deal of pleasure in listening to this long line of experience, and to one who can get such results. There is one thing I would like to call your attention to that may help in these cases, and that is the use of the carpenter's mallet. Afterwards, it is put up in the Whitman plaster spica. It simply adds an impaction which we know stimulates callus formation.

But there are a good many other uses for it than that. One of my early cases was a fracture of the astragalus. Under full anesthesia and exerting my full strength I was unable to replace the fracture. Finally we sent for a carpenter's mallet and it was a very simple thing to do it then with a few blows of the mallet. In a Pott's fracture, where the joint has spread a good deal and you are not able to get a good position for the malleolus, turn the leg on the side and with a soft pad of gauze over the malleolus. With a mallet the malleolus may be molded into place easily, almost as though it were putty. One doesn't need to use much force. The only thing about it is that you may get a little too snug instead of a loose joint. That has happened in only one of my cases, but nature is very kind and the bone and cartilage are absorbed backwards and the joint was finally made all right.

Dr. Cotton, of Boston, first used the carpenter's mallet in cases of intracapsular fracture at the hip to induce an impaction in addition to the proper Whitman position and so add one important factor in the healing.

DR. E. T. FARR: I enjoyed Dr. Magie's paper very much. He is somewhat contradictory in his statements. In the first place he always objects to the use of authorities, but he must know that in this instance at least he must be considered one. Second, he criticizes the younger men for using the Lane plate with too much frequency, and I must say this is the first time I have ever heard him admit that he was not one of the younger men like the rest of us. I know of no papers we have had in recent years that have been more instructive than the papers of Dr. Magie and Dr. More, and I regret that their teaching is not more closely followed by the men who treat an occasional fracture. There is still too much of a craze for operating and men do not obtain the results they should by the use of the closed methods. I recently treated a girl ten years old for a fracture of the femur. During my absence from the hospital another surgeon took charge of the case and had made arrangements to take the girl to the operating room. Just at that time the case changed hands once more. We put the girl in Buck's extension and the result is so perfect that it is practically impossible to tell which leg had been broken.

The doctor mentioned the method of Steinman. I believe priority in the use of pin through the heel belongs to Anschütz. In the cases in which I have used it, that is cases of fracture just above the ankle joint, I have not

had any trouble. I believe it is one of the open methods that may be used very safely.

DR. C. SCHWYZER: I would like to have Dr. Magie make a remark on impacted fractures. The diagnosis is not easily made. I recall two cases. One a woman who made a misstep in getting off a street-car. The physician made very accurate measurements and we could not find any swelling. Dr. Geist made an x-ray and it showed an impacted fracture.

I have a case at present in the hospital—a boy who was thrown from a truck going around a corner. He got up and walked. After a while the leg pained him so much he had to give up walking. X-ray pictures were made but even with these it was very hard to recognize the line of break. Clinically, though, we feel that the large trochanter is dislocated upward about half an inch.

The treatment of fracture varies very much. I just recall a case of a man of 64 years with a fracture of the thigh about a hand's breadth below the joint. We put him at once in a plaster-of-paris cast. Deep anesthesia was necessary. Traction on the leg downward and on the pelvis upward was established until the cast was completed. When the plaster-of-paris was hardened the old man was put on his feet on crutches. The fracture was solidly healed when the cast was removed six weeks later. Such treatment of fracture may still be justified at the present time, but it is not considered good practice an account of other reasons.

DR. MAGIE (in closing): In this series we show only a few of the fractures we have had in the last five years. My experience in the treatment of fractures was much greater than this. The reason we have shown no impacted fractures here is that we have not had one recently. I remember the days when we often overlooked them until the leg got short; then we came to the conclusion that we had had an impacted fracture. Nowadays there is no reason why we can't diagnose impacted fracture.

What I wanted to lay particular stress on in this paper was the injuries to the small bones of the foot. They are so common and so unsuspected. In any sprain of any kind, take an x-ray picture and you will be surprised to find how many of them have fractures. In doing this you will be able to give them the proper kind of treatment.

HARRY P. RITCHIE,
Secretary.

PROGRESS

Abstracts to be submitted to Section Supervisors.

MEDICINE

SUPERVISORS:

F. J. HIRSCHBOECK,
FIDELITY BLDG., DULUTH
THOMAS A. PEPPARD,
LA SALLE BLDG., MINNEAPOLIS

SOME THEORETICAL AND SOME PRACTICAL ASPECTS OF PSYCHANALYSIS: Charles K. Mills, Emeritus Professor of Neurology, University of Pennsylvania, Consulting Neurologist to the Philadelphia General

Hospital. (Arch. of Neur. and Psych., December, 1921.) The teachings of Freud have made variable impressions on the medical world. While many physicians have taken the "I'm from Missouri" attitude, a certain number of them have become very enthusiastic followers of Freud. Others have, on the other hand, developed a violent dislike to psychoanalysis. Charlatanism has frequently thrived because of it. Magazines occasionally devote column after column, expounding its theories in a very impressionistic style to unsuspecting or curious readers. It must be admitted, however, by the impartial observer, that the endeavors of the astute and unusually keen Austrian physician have profoundly influenced present day psychology and psychiatry. Mental symptoms are now being studied more from the interpretative standpoint rather than the merely descriptive. The so-called behavioristic psychology has received its impetus. We are not content to merely give our attention separately to intellect, emotion, etc., but we endeavor to see in conduct the particular type reaction to all factors influencing it.

Mills quotes psychoanalytic writers frankly, accusing others of mystic tendencies, or defending themselves against such accusations. He deprecates particularly the freudian sexual symbolism and speaks of their references to legends and painting as indicating only "how they read their own ideas into these." He criticises the varied interpretations given to the word unconscious, yet does not tell us how he himself would define it. The Oedipus and Electra complex are prominently scathed. "Dreams," he avers, "reflect currents of alert consciousness; sex and hunger play a secondary part in the behavior of mankind in general." The method of psychoanalysis is shown to have played but a minor part in the development of war neuroses, while fatigue and the instinct of self-preservation were more important. A profounder study of sex resulting from psychoanalysis he regards as beneficial. Concentration on its mystic aspects is harmful, just as is the case with other allied cults. Finally, he gives it as his opinion that psychoanalysis is now tending toward the discard.

J. C. MICHAEL.

THE DETERMINATION OF CLINICAL ACTIVITY IN PULMONARY TUBERCULOSIS FROM ROENTGENOGRAMS: (Preliminary Study.) Ornstein and Sampson. (Am. Rev. of Tuberculosis, December, 1921, p. 842.) Criteria of activity at present are largely clinical. A minimal lesion may at times give a greater symptom complex than a more advanced case. This is usually attributed to differences of virulence or resistance. The degree of toxemia produced by a lesion depends upon circulation. The amount of toxemia depends upon the extent of the lesion which the circulation drains. Interpretation of shadows in roentgenograms should always be associated with the pathological process which may account for such shadows.

Study based on 100 cases. Stereoroentgenograms diagnosed as active, retrogressive and healed, independently of any other information. Opinions agreed with clinical findings in 87 per cent. Five cases called active by clinician diagnosed as inactive by x-ray. Out of 74 cases diagnosed clinically as inactive eight were called active by x-ray.

Activity is indicated in roentgenogram by

1. Mottling with ill defined margins.

2. Presence of spontaneous and localized pneumothoraces.

Diminished activity runs parallel to the amount of fibrous and calcification that has taken place.

T. A. PEPPARD.

THE UREA CONCENTRATION TEST FOR KIDNEY FUNCTION. Edward Weiss (The Med. Clin. of North America, November, 1921) discusses the diagnosis of kidney disease from the standpoint of determining kidney function. He evaluates some of the more accurate methods, as (1) the phenolsulphonephthalein test, (2) the determination of degree of retention in the blood of various metabolic product, such as urea, non-protein nitrogen, creatinin, and uric acid, (3) "two hour" or Mosenthal test, (4) Ambard's coefficient or McLean's index. He shows that the P. S. P. test and the determination of the degree of nitrogen retention do not show the early involvement in chronic nephritis, that the "two hour" test is so delicate that its interpretation is often difficult and sometimes inaccurate, and that the methods of Ambard and McLean are too technical.

He points out that urea possesses certain advantages as test substance for renal function, which he outlines as follows: "(1) It is a true and product of protein metabolism and is incapable of further alteration within the body. (2) It is a normal excretory product. (3) It is excreted practically only by the kidney. (4) It may be given in large doses and is readily absorbed and taken up equally by all the tissues and fluids without producing any ill effects. (5) The administration of a large dose of urea throws a strain upon the kidneys. This appears to be its greatest advantage as a test substance for renal function."

He gives the technique of the urea concentration test and the interpretation of the same. Several tables are shown, comparing the "Urea Concentration Test" with other functional methods of estimating renal function in the various types of nephritis and in cardio-vascular renal disease. Its value in prognosis is also shown.

He concludes as follows: "The urea concentration test appears to be a simple and fairly reliable method of determining the efficiency of the kidney, but, notwithstanding certain theoretic advantages which it possesses over other methods, practically it is not ideal, and should, therefore, be considered a useful adjunct to be employed in conjunction with other methods, the whole being weighed with the clinical data in an evaluation of a case of renal disease."

P. G. BOMAN.

SURGERY

SUPERVISORS:

E. MENDELSSOHN JONES,
LOWRY BLDG., ST. PAUL
VERNE C. HUNT,
MAYO CLINIC, ROCHESTER

A SAFE METHOD OF REMOVING SIGMOIDAL POLYPS AND HIGH RECTAL POLYPS: L. A. Buie. (Southern Minnesota Medical Association, December 5,

1921.) The author describes an instrument which can be operated through the proctoscope for the successful removal of polyps from the sigmoid and rectum. The instrument, which is about 35 cm. in length, is composed of two crushing jaws operated by screw appliances on the end of a narrow tubular shaft. The patient, after thorough cleansing of the rectum, is placed in the knee-chest posture, the proctoscope inserted and the polyp located. The clamp is then passed in with the jaws open and, with the aid of a special hook and fork, the pedicle of the polyp is drawn into the jaws of the clamp. By turning the screws on the end of the instrument the jaws are approximated and the pedicle crushed. The proctoscope is now removed and the clamp allowed to remain in position for 24 hours. During this time the patient must be kept in bed and not permitted to change position without assistance because the handle of the clamp projects for a short distance from the anus and might easily be dislodged or damage the bowel. When the clamp is to be removed the screws are loosened to the limit, thus opening the jaws. Proctoscopic examination should now be made in order to ascertain the condition of the polyp. It will slough off in two or three days. The patient should remain in bed during this time.

A recent modification permits the clamping end to be detached and remain in the rectum. The handle can be reapplied for its removal. The author reports three successful cases treated by the technic described.

V. G. BURDEN.

SOME OBSERVATIONS ON CASES OF NON-UNION OF FRACTURES IN THE LOWER THIRD OF THE TIBIA: E. L. Eliason. (Surg., Gyn. and Ob., November, 1921.) In discussing delayed or non-union of fracture of the lower third of the tibia, E. L. Eliason states that there are two groups of causative factors: extrinsic and intrinsic.

In reference to extrinsic factors he states that fixation and position have no bearing on the result, because good reduction and perfect fixation are sometimes followed by delayed or non-union. Chief among intrinsic factors are the reduction, and the blood supply. Accurate reduction has little bearing on the result provided no substance foreign to the site is interposed. The anatomy and the blood supply, however, are quite important.

The tense fascia in the lower third of the leg, when not torn, as by a compound fracture, permits of almost no stretching. This condition causes pressure on vessels and nerves, and trophic changes are the result.

The nutrient artery enters the tibia in its upper third and is cut off from the lower fragment in fractures of lower third. The anterior tibial artery is the source of the greater part of blood supply to the lower third of tibia, and is so located that it is liable to injury in these fractures. The lower third of the tibia receives only a small portion of the rich arterial anastomosis of the foot and ankle. When the posterior tibial artery is severed, it practically always means gangrene which necessitates amputation.

In a series of non-union cases of the tibia it was noted that the foot on the affected side was often cooler; the dorsalis pedis pulse was weaker; and the blood pressure

reading, taken below the fracture, was from five to fifteen millimeters mercury lower with the leg elevated, and five to ten lower with the leg hanging.

The x-ray plates of these delayed or non-union fractures show more marked osteoporosis and absorption and less callus shadow in the lower fragments. At operation, the x-ray findings are confirmed. The lower fragment is soft, spongy, osteoporotic, and shows less callus activity. There is very little filling in of the medullary canal, and there is very little bleeding from the lower fragment. Microscopic findings show that there is very much less active proliferation in the lower fragment.

In dog-experimentation, ligation of the anterior tibial made no demonstrable difference in the callus. Union, however, was a little slower in becoming firm in the ligated cases.

C. CURRY BELL.

GYNECOLOGY AND OBSTETRICS

SUPERVISORS:

ARCHIBALD L. McDONALD,

FIDELITY BLDG., DULUTH

ALBERT G. SCHULZE,

LOWRY BLDG., ST. PAUL

SOME FIGURES ON CAESAREAN SECTION: John M. Birnie (Boston Med. & Surg. Mag., Jan. 26, 1922). This is a study of the experience with all of the Caesarean sections done in Springfield, Mass., during a period of twelve years and is of interest in comparison with the results obtained in large special clinics.

There were 217 operations done in five hospitals by 29 operators of varying experience. During the same period 39,069 births were reported in Springfield, making an incidence of one section to 180 cases as compared with one to 133 in the Sloan Maternity. A maternal mortality of 11 per cent for the entire series, which included many unfavorable cases, is compared with figures quoted from Davis at the New York Lying-in Hospital of 10.7 per cent in a series of 571 cases. While it was impossible for the author to present detailed studies of the individual cases, he is of the opinion that results in the hands of even the occasional operator are better than is commonly believed.

It is noteworthy that a wide variety of indications were accepted and there is room for discussion as to the propriety of the treatment in many cases. The indications were as follows: 64 contracted pelvis, 4 for previous section, 53 for toxemias with a maternal mortality of 24 per cent; inertia of the uterus in 22 cases, with 4 deaths; breech presentation, 4 cases; cervical scar tissue, 4 cases; elderly primiparae, 3, with 1 death; transverse presentation, 2 cases; bicornuate uterus, 2 cases, with 1 death; face and brow presentation with 1 each; hydrocephalus, 1 case. One should note that, at least, occiput posterior presentation was not accentuated as an indication.

ARCHIBALD L. McDONALD.

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Minnesota State Medical Association

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Annual meeting, October

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Bergheim, M. C.....Hawley
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Bernard, B. C.....Lake Park

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Holt, E. E.....Detroit
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Red River Valley Medical Society

Kittson, Marshall, Polk, Roseau, Pennington, Red Lake and Norman Counties
Regular meetings in March, June, September and December
Annual meeting, December

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Blegen, H. M.....Warren
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Bertelson, O. L.....Crookston
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Dampier, C. E.....Crookston

Daniels, W. H.....Crookston
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Holly, Wallace W.....Warren
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West Central Minnesota Medical Society

Bigstone, Traverse, Stevens, Pope, and part of Grant Counties
Regular meetings, June 15, 1922
Annual meeting, December 1, 1922

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Christeson, C. R.....Morris
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Bates, B.Wheaton
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Gibbon, L. L.....Lowry
Karn, B. R.....Ortonville

Leland, J. T.....Herman
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Park Region District Medical Society

Ottertail, Douglas, Grant and Wilkin Counties
Regular meetings, second Wednesday in January, April, July and October
Annual meeting in January

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Baker, A. C.....Fergus Falls
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Paulson, Theo. S.....Fergus Falls

Baker, A. C.....Fergus Falls
Boysen, P.Pelican Rapids
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Freeborn, J. A.....Fergus Falls
Gilkinson, A. J.....Osakis
Gowdy, R. A.....Alexandria
Hand, W. R.....Elbow Lake
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Vigen, J. G.....Fergus Falls
Wray, W. E.....Campbell

SECOND DISTRICT

COUNCILOR, J. G. MILLSPAUGH, M. D. (1 year).....Little Falls

Aitkin County Medical Society

Regular meetings, first Monday in each month
Annual meeting, first Monday in December

President
Graves, CarltonAitkin
Secretary
Ratcliffe, J. J.Aitkin

Catlin, T. J.Pillsbade
Graves, C.Aitkin
Kelly, B. W.Aitkin
McHugh, R.Aitkin

Ratcliffe, J. J.Aitkin

Upper Mississippi County Medical Society

Crow Wing, Morrison, Cass and Beltrami Counties
Annual meeting, January 18, 1922

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Nordin, C. G.Brainerd
Secretary
Badeaux, G. I.Brainerd

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Badeaux, G. I.Brainerd
Beise, R. A.Brainerd
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Douglas, J. E.State Sanatorium
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Ghostley, Mary.Internat'l Falls
Gilmore, R.Bemidji
Halenback, P. L.Crosby
Hall, P. M.State Sanatorium

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Holman, E. E.Pine River
Holst, C. F.Little Falls
Holst, J. B.Little Falls
House, L. E.Cass Lake
Houston, C. A.Park Rapids
Johnson, E. W.Bemidji
Johnson, O. V.Sebeka
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Knights, S. G.Randall
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Laughlin, J. T.Grey Eagle
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Nelson, NesmithBrainerd
Nicholson, Jos.Brainerd
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Osburn, B. O.International Falls
Parrott, B. W.Long Prairie

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THIRD DISTRICT

COUNCILOR, W. A. DENNIS, M. D. (1 year).....St. Paul

Ramsey County Medical Society

Regular meetings, last Monday of each month except June, July and August
Annual meeting last Monday in January

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Secretary
Hammes, E. M.St. Paul

Abbott, J. S.St. Paul
Abramovich, J. H.St. Paul
Ahrens, A. E.St. Paul
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Aldes, HarrySt. Paul
Alexander, F. H.St. Paul
Allen, MasonSt. Paul
Ancker, A. B.St. Paul
Anderson, H. C.St. Paul
Arends, A. L.St. Paul
Armstrong, J. M.St. Paul
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Boeckmann, Eg'lSt. Paul
Bohland, E. H.St. Paul
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Boleyn, E. S.St. Paul

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Burns, R. M.St. Paul
Buscher, H.St. Paul
Cameron, J. A.St. Paul
Campbell, E. PaulSt. Paul
Campbell, J. E.South St. Paul
Cannon, C. M.St. Paul
Cannon, HarrySt. Paul
Carman, C. L.St. Paul
Carman, Paul I.St. Paul
Carroll, Wm. C.St. Paul
Cavanaugh, J. O.St. Paul
Chandler, O. B.St. Paul
Chatterton, C. C.St. Paul
Christiansen, A.St. Paul
Christison, J. T.St. Paul
Churchill, A. G.St. Paul
Clark, T. C. Soldiers' Home, Mpls.
Cobb, S. G.St. Paul
Cole, WallaceSt. Paul
Collie, H. G.St. Paul
Colvin, A. R.St. Paul
Comstock, A. E.St. Paul
Connor, C. E.St. Paul
Cook, Paul B.St. Paul
Corniea, A. D.St. Paul

Cowern, E. W.North St. Paul
Dack, L. G.St. Paul
Darling, J. B.St. Paul
Daugherty, E. B.St. Paul
Daugherty, L. E.St. Paul
Davis, HerbertSt. Paul
Davis, WilliamSt. Paul
Dedolph, K.St. Paul
Dennis, W. A.St. Paul
Dickson, Thos. H., Jr.St. Paul
Dittman, Geo. C.St. Paul
Dohm, A. J.St. Paul
Drake, Carl B.St. Paul
Dunn, J. N.St. Paul
Earl, Geo. A.St. Paul
Earl, Robert C.St. Paul
Ely, O. S.South St. Paul
Engberg, E. J.St. Paul
Ernest, G. C.St. Paul
Eshelby, E. C.St. Paul
Evert, John A.St. Paul
Ferguson, J. C.St. Paul
Fogarty, C. W.St. Paul
Freeman, C. D.St. Paul
Fulton, J. F.St. Paul
Furber, W. W.Cottage Grove
Gager, E. C.St. Paul
Geer, Everett K.St. Paul
Geissinger, John D.St. Paul
Geist, Geo. A.St. Paul
Ghent, HarrySt. Paul
Ghent, M. M.St. Paul
Giere, E. O.St. Paul
Giffillan, J. S.St. Paul
Ginsberg, Wm.St. Paul
Goltz, E. V.St. Paul
Gotham, C. L.St. Paul
Gratzek, Thos.St. Paul
Greene, C. L.St. Paul
Gruenhagen, Arnold P.St. Paul

Hagaman, Geo. K. St. Paul
Hall, A. R. St. Paul
Hammes, E. M. St. Paul
Hammond, J. F. St. Paul
Hathaway, S. J. Minneapolis
Hawkins, V. J. St. Paul
Health, A. C. St. Paul
Hengstler, W. H. St. Paul
Hensel, C. N. St. Paul
Herrmann, E. T. St. Paul
Heseltine, V. G. Taylors Falls
Hesselgrave, S. S. St. Paul
Hilger, A. W. St. Paul
Hilger, D. D. St. Paul
Hilger, L. A. St. Paul
Hoff, Alfred St. Paul
Hoff, Peder A. St. Paul
Holcomb, J. P. St. Paul
Holcomb, O. W. St. Paul
Holl, P. M. Minneapolis
Howard, W. S. St. Paul
Hullsiek, H. E. St. Paul
Hunt, H. E. St. Paul
Ide, Arthur W. St. Paul
Jeslon, J. W. St. Paul
Johnson, Asa M. St. Paul
Johnson, Hartland C. St. Paul
Johnson, T. H. St. Paul
Jones, E. M. St. Paul
Kannary, E. L. St. Paul
Kelly, John V. St. Paul
Kelly, Paul H. St. Paul
Kern, M. J. St. Cloud
Keating, Herman St. Paul
King, Walter E. St. Paul
Klein, H. N. St. Paul
Knauff, M. K. St. Paul
Kramer, G. B. St. Paul
Kvitrud, G. St. Paul
Langenderfer, F. V. St. Paul
Larsen, C. L. St. Paul
Leavenworth, R. O. St. Paul
Leahy, B. St. Paul
Leitch, Archibald St. Paul
Lepak, John A. St. Paul
Lerche, William St. Paul
Lewis, J. B. South St. Paul
Lewis, W. W. St. Paul
Lick, C. Louis St. Paul
Little, J. J. St. Paul
Lufkin, H. M. St. Paul
Lundholm, A. M. St. Paul
McCarthy, W. R. St. Paul
McClanahan, J. H. White Bear

McClanahan, T. S. White Bear
McCloud, C. N. St. Paul
McCormick, Thos. F. St. Paul
McDavitt, Thomas St. Paul
McKeon, Owen St. Paul
McLaren, Jennette M. St. Paul
McNevin, C. F. St. Paul
MacLaren, Archibald St. Paul
Maloney, T. J. St. Paul
Mark, Arthur E. St. Paul
Martineau, J. L. St. Paul
Meyerding, E. A. St. Paul
Mitchell, Frederick St. Paul
Mogilner, S. N. St. Paul
Molander, H. A. St. Paul
Molzahn, Herman E. St. Paul
Morris, R. Edwin St. Paul
Morrisey, F. B. St. Paul
Mortensen, N. G. St. Paul
Moynihan, T. J. St. Paul
Murphy, E. F. St. Paul
Meyers, Thos. St. Paul
Neher, F. H. St. Paul
Nelson, L. A. St. Paul
Nichols, A. E. St. Paul
Nippert, H. T. St. Paul
Norris, E. H. St. Paul
Nye, Katherine A. St. Paul
O'Brien, H. J. St. Paul
Oerting, Harry St. Paul
Ogden, B. H. St. Paul
Ohage, Justus, Jr. St. Paul
Olson, Chas. A. St. Paul
Ostergren, E. W. St. Paul
Pearson, F. R. St. Paul
Pedersen, A. H. St. Paul
Perry, C. G. St. Paul
Peterson, V. N. St. Paul
Pine, Auten A. St. Paul
Plondke, J. J. St. Paul
Platt, J. J. St. Paul
Pool, Daniel St. Paul
Ramsey, W. R. St. Paul
Richards, E. T. F. St. Paul
Riggs, C. Eugene St. Paul
Ritchie, H. P. St. Paul
Rogers, F. D. St. Paul
Rogers, John T. St. Paul
Rothrock, J. L. St. Paul
Rothschild, H. J. St. Paul
Roy, Philemon St. Paul
Rutherford, W. C. St. Paul
Ryan, John J. St. Paul
Savage, F. J. St. Paul

Schatz, F. J. St. Paul
Schoch, R. B. J. St. Paul
Schons, E. St. Paul
Schuldt, F. C. St. Paul
Schulze, Albert G. St. Paul
Schwyzer, Arnold St. Paul
Senkler, G. E. St. Paul
Shannon, W. Ray St. Paul
Shellman, John L. St. Paul
Shimonek, Anton St. Paul
Simon, B. F. St. Paul
Simon, Geo. H. St. Paul
Skinner, H. O. St. Paul
Sneve, Haldor St. Paul
Snyder, Geo. W. St. Paul
Sohlberg, Olof St. Paul
Sprafka, J. M. St. Paul
Staley, J. C. St. Paul
Steen, A. H. Cottage Grove
Sterner, E. G. St. Paul
Sterner, O. W. Lake Elmo
Stevens, F. A. Lake Elmo
Stierle, Adolph, Jr. St. Paul
Stinnette, S. E. St. Paul
Stolpestad, H. L. St. Paul
Swanson, Edwin O. St. Paul
Sweeney, Arthur St. Paul
Taylor, H. L. St. Paul
Teisberg, C. B. St. Paul
Tiber, L. J. St. Paul
Van Norman, R. H. St. Paul
Van Slyke, Chas. A. St. Paul
Vercellini, G. St. Paul
Von der Weyer, William. St. Paul
Wald, R. H. St. Paul
Wallinga, John H. St. Paul
Warren, E. L. St. Paul
Walters, B. Frank. St. Paul
Warner, E. F. St. Paul
Warwick, Margaret St. Paul
Welch, M. C. St. Paul
Wheeler, M. W. St. Paul
Whitacre, J. C. St. Paul
Whitcomb, Ed. H. St. Paul
White, J. S. St. Paul
Whitmore, F. W. St. Paul
Whitney, A. W. St. Paul
Williams, Clayton St. Paul
Winnick, J. B. St. Paul
Wold, K. C. St. Paul
Wood, H. G. St. Paul
Ylvisaker, L. S. St. Paul
Zander, C. H. St. Paul
Zimmerman, H. B. St. Paul

Washington County Medical Society

Regular meetings held on second Tuesday of the odd numbered months
Annual meeting, November

President
Haines, J. H.
Secretary
Landeon, F. G.
Clark, G. E. Stillwater

E. O. B. Freligh. Stillwater
Haines, J. H. Stillwater
Humphrey, W. R. Stillwater
Kalnoff, D. Stillwater
Landeon, F. G. Stillwater
Mingo, F. E. Hugo

Newman, G. A. Stillwater
Poirier, J. A. Forest Lake
Sherman, C. H. Marine-on-St. Croix
Stuhr, J. W. Stillwater
Thompson, V. C. Stillwater

Chisago-Pine County Medical Society

Regular meetings
Annual meeting

President
Secretary
Bohling, B. S. Sandstone

Dredge, H. P. Sandstone
Flom, A. O. Chisago City
Gray, Clyde E. Rush City
Kelsey, C. G. Hinckley

Magnuson, H. V. Bell, Cal.
Paulson, C. W. North Branch
Zeien, Thos. North Branch

Central Minnesota District Medical Society

Mille Lacs, Sherburne, Isanti and Kanabec
Regular meetings, January, April, July and October
Annual meeting, July

President
Cooney, H. C. Princeton
Secretary
Parsons, Geo. E. Elk River

Bacon, H. P. Milaca
Clifton, T. A. Isanti
Cooney, H. C. Princeton
Frasier, Geo. W. Duluth
Phelps, A. E. Ogilvie

Parsons, Geo. E. Elk River
Roodman, I. M. Ponsford
Swenson, Chas. Braham
Stocking, Fred F. Milaca
Shulean, N. S. Cambridge

St. Louis County Medical Society

St. Louis, Cook and Lake

Regular meetings, second Thursday of each month
Annual meeting, second Thursday in October

President
Haney, C. L.Duluth
Secretary
Magney, F. H.Duluth

Abbott, Wm. P.Duluth
Adams, B. S.Hibbing
Arminen, K. V.Duluth
Ayers, G. T.Ely
Bagley, W. R.Duluth
Baldwin, O. J.Chisholm
Barney, L. A.Duluth
Bergquist, K. E.Duluth
Binet, H. E.Grand Rapids
Bowman, P. G.Duluth
Boyer, S. H.Duluth
Braden, A. J.Duluth
Bray, C. W.Blwabik
Briggs, F. W.Duluth
Bullen, F. W.Hibbing
Burns, H. J.Duluth
Carstons, C. F.Hibbing
Chapman, T. L.Duluth
Cheney, E. L.Duluth
Clark, F. F.Duluth
Collins, A. N.Duluth
Collins, H. C.Duluth
Cosgrove, J. H.Duluth
Coventry, W. A.Duluth
Crowe, J. H.Virginia
Davis, E. F.Duluth
Davis, H. S.Duluth
Doolittle, E. L.Duluth
Drenning, F. C.Duluth
Dugren, F. L.Nopeming
Elsenman, W. F.Chisholm
Ekblad, J. W.Duluth
Eklund, J. J.Duluth
Eklund, W. J.Duluth
Elias, F. J.Duluth
Fahey, E. W.Duluth
Forbes, R. S.Duluth
Gauthier, W.Virginia
Gendron, J. F.Grand Rapids
Goodman, C. E.Virginia
Gillespie, N. H.Duluth
Graham, David.Duluth
Graham, Reginald.Duluth

Graham, Robert.Duluth
Grawn, F. A.Duluth
Greeley, L. Q.Duluth
Ground, H. T.Virginia
Hall, A. E.Cusson
Haney, C. L.Duluth
Hayes, M. F.Nashauk
Helmark, O. E.Duluth
Hirschboeck, F. J.Duluth
Hirschfield, M. S.Duluth
Hovde, H.Duluth
Hursch, M. H.Grand Rapids
Jensen, T. J.Duluth
Judson, W. E.Duluth
Kean, N. D.Coleraine
Keisling, I. H.Hibbing
Keyes, C. R.Duluth
King, Wm. S.Eveleth
Klein, H.Duluth
Kohlbray, C. O.Duluth
Kraft, P.Duluth
Kuth, J. R.Duluth
Laird, A. T.Nopeming
Loofbourrow, E. H.Keewatin
Lenont, C. B.Virginia
Lindgren, E. I.Duluth
Linneman, N. L.Duluth
Lepak, F. J.Duluth
Lum, C. E.Duluth
Lynam, F.Duluth
McAuliffe, J. A.Duluth
McCarthy, Paul D.Babitt
McComb, C. F.Duluth
McCoy, Mary.Duluth
McDonald, A. L.Duluth
McGiffert, E. N.Duluth
McHaffie, O. L.Duluth
McIntyre, E. H.Virginia
Magie, W. H.Duluth
Magney, F. H.Duluth
Manley, J. R.Duluth
Martin, E. T.Marble
Martin, T. R.Duluth
Mattill, P. M.Chisholm
Merriman, L. L.Duluth
More, C. W.Eveleth
Morse, C. R.Hibbing

Morsman, C. F.Hibbing
Murray, D. D.Duluth
Nelson, E. H.Chisholm
Nicholson, M. A.Duluth
Oredson, O. A.Duluth
Pake, S. G.Duluth
Paradine, J.Duluth
Pare, L. T.Duluth
Parker, O. W.Ely
Payette, C. H.Duluth
Pennie, D. F.Duluth
Raadquist, C. S.Hibbing
Raihala, J.Virginia
Reynolds, H.Hibbing
Rippert, J. A.Proctor
Rood, D. C.Hibbing
Robinson, J. M.Duluth
Rowe, O. W.Duluth
Rudie, P. S.Duluth
Ryan, J. W.Duluth
St. Clair, G. G.Duluth
Saam, J. G.Eveleth
Scherer, C. A.Duluth
Schroder, C. H.Duluth
Schwartz, A. N.Duluth
Seashore, D. E.Duluth
Shapiro, E. Z.Duluth
Shaw, A. W.Buhl
Slyfield, F. F.Duluth
Spicer, F. W.Duluth
Smith, C. C.Carson Lake
Strathern, M. L.Gilbert
Strobel, W. G.Duluth
Sukeforth, L. A.Duluth
Sutherland, H. N.Ely
Tibbetts, M. H.Duluth
Tilderquist, D. L.Duluth
Tuohy, E. L.Duluth
Turnbull, F. M.Duluth
Vercellini, C. E.Duluth
Wagner, C. E.Duluth
Walker, A. E.Duluth
Webber, E. E.Proctor
Webster, H. W.Duluth
Wilkinson, Stella.Duluth
Winter, J. A.Duluth
Young, V. A.Duluth

Carlton County Medical Society

Regular meetings, first Monday of each month
Annual meeting, December

President
Stuart, A. B.Cloquet
Raiter, Franklin W. S.Cloquet

Blakely, C. C.Barnum
Brunet, L. M.Cloquet
Fleming, J.Cloquet
Gilbert, J. R.Carlton

Raiter, Franklin W. S.Cloquet
Spurbeck, E. G.Cloquet
Stuart, A. B.Cloquet
Walters, F. R.Moose Lake

FOURTH DISTRICT

COUNCILOR, R. J. HILL (5 years)Minneapolis

Hennepin County Medical Society

Regular meetings, first Monday in each month excepting July and August
Annual meeting, first Monday in January

President
Benjamin, A. E.Minneapolis
Secretary
La Vake, R. T.Minneapolis
Abbott, A. W.Minneapolis
Adair, F. L.Minneapolis
Ailing, C. P.Minneapolis
Allen, H. W.Minneapolis
Almquist, H. E.Minneapolis
Anderson, A. E.Minneapolis
Anderson, Arnt.Minneapolis
Anderson, J. D.Minneapolis
Anderson, James K.Minneapolis
Annis, H. B.Minneapolis
Arey, H. C.Excelsior
Aune, Martin.Minneapolis
Aurand, W. H.Minneapolis
Aurness, P. A.Minneapolis
Austin, E. E.Minneapolis
Avery, J. F.Minneapolis
Alymer, A. L.Minneapolis
Baier, Florence.Minneapolis
Baker, A. T.Minneapolis

Baker, E. L.Minneapolis
Baker, Looe.Minneapolis
Baker, Harry A.Minneapolis
Bakke, O. H.Minneapolis
Baldwin, L. B.Minneapolis
Bank, H. E.Minneapolis
Barner, Henry Adolph.Minneapolis
Barten, E. R.Minneapolis
Bass, G. W.Minneapolis
Barron, Moses.Minneapolis
Baxter, S. H.Minneapolis
Beard, Archie.Minneapolis
Beaudoux, Henry A.Minneapolis
Bell, J. W. Jr.Minneapolis
Bell, J. W. Sr.Minneapolis
Benedict, E. E.Minneapolis
Benjamin, A. E.Minneapolis
Benn, A. F. G.Minneapolis
Benson, Geo. E.Minneapolis
Benson, R. D.Minneapolis
Bessesen, A. N.Minneapolis
Bishop, Chas. W.Minneapolis

Bissell, F. S.Minneapolis
Blake, James.Hopkins
Bockman, M.Minneapolis
Booth, A. E.Minneapolis
Boquist, E. T. W.Minneapolis
Boreen, C. A.Minneapolis
Bowman, H. A. H.Minneapolis
Bratrud, Arthur F.Minneapolis
Broker, V. S.Minneapolis
Brooks, Chas. N.Minneapolis
Brown, E. J.Minneapolis
Brown, Edwin D.Minneapolis
Brown, Paul F.Minneapolis
Brown, R. S.Minneapolis
Bulkeley, Kenneth.Minneapolis
Butler, John.Minneapolis
Byrnes, W. J.Minneapolis
Sabot, V. S.Minneapolis
Camp, Walter E.Minneapolis
Campbell, Lowell N.Minneapolis
Campbell, Robert.Minneapolis
Carey, Jas. B.Minneapolis
Cavanor, F. T.Minneapolis

Carlaw, C. M. Minneapolis
 Cheelen, S. J. Minneapolis
 Chowning, Wm. Minneapolis
 Cirkler, A. A. Minneapolis
 Clark, Howard S. Minneapolis
 Condit, W. H. Minneapolis
 Cook, H. W. Minneapolis
 Corbett, J. Frank. Minneapolis
 Cozman, E. O. Minneapolis
 Crafts, L. N. Minneapolis
 Cranmer, Richard R. Minneapolis
 Cross, John G. Minneapolis
 Crume Geo. F. Minneapolis
 Curtin, John F. Minneapolis
 Cutts, Geo. Minneapolis
 Dahl, Elmer O. Minneapolis
 Dahl, John A. Minneapolis
 Dahlstrom A. W. Minneapolis
 Dart, L. D. Minneapolis
 Daniel, Donald H. Minneapolis
 Dezziel, G. Minneapolis
 Disen, C. F. Minneapolis
 Donaldson, Minneapolis
 Dornblaser, H. Bright. Minneapolis
 Doxey, G. L. Minneapolis
 Dorge, Richard. Minneapolis
 Drake, Chas. R. Minneapolis
 Driesbach, N. Minneapolis
 Dunn, Lewis. Minneapolis
 Dunsmoor, F. A. Minneapolis
 Dunn, Geo. Robert. Minneapolis
 Dutton, E. C. Minneapolis
 Egan, John M. Minneapolis
 Eggen, O. K. Minneapolis
 Egilsrud, Kristian. Minneapolis
 Eitel, G. G. Minneapolis
 Elsier, Edwin R. Minneapolis
 Erb, Fred A. Minneapolis
 Everlof, J. L. Minneapolis
 Ericson, John G. Minneapolis
 Faneler, W. A. Minneapolis
 Farr, R. E. Minneapolis
 Feldt, W. W. Minneapolis
 Fischer, G. Minneapolis
 Fitzgerald, D. Minneapolis
 Fjellman, R. C. Minneapolis
 Fjelstad, C. Alford. Minneapolis
 Floeming, A. S. Minneapolis
 Flocken, Chas. F. Minneapolis
 Fox, John M. Minneapolis
 Franzen, H. C. Minneapolis
 Gardner, E. L. Minneapolis
 Geist, Emil. Minneapolis
 Glessler, Paul W. Minneapolis
 Gilles, L. L. Minneapolis
 Gordon, G. J. Minneapolis
 Gosin, D. F. Minneapolis
 Graves, Floyd. Minneapolis
 Green, E. K. Minneapolis
 Goss, Harold L. Rochester
 Groll, S. Minneapolis
 Guilford, H. M. Minneapolis
 Gunderson, Harley J. Minneapolis
 Hacking, Frank. Minneapolis
 Hagen, G. L. Minneapolis
 Haggard, G. D. Minneapolis
 Hall, J. M. Minneapolis
 Hallowell, W. H. Minneapolis
 Hamel, Arnold L. Minneapolis
 Hamel, C. E. Minneapolis
 Hamilton, A. S. Minneapolis
 Hansen, Erling. Minneapolis
 Hanson, Olga. Minneapolis
 Hare, E. R. Minneapolis
 Hartig, Hugo J. Minneapolis
 Harrington, C. D. Minneapolis
 Hartzell, Thos. B. Minneapolis
 Haverfield, Addie R. Minneapolis
 Hayes, J. M. Minneapolis
 Haynes, F. E. Minneapolis
 Head, G. D. Minneapolis
 Hearn, Wm. O. Minneapolis
 Hedback, A. E. Minneapolis
 Hedding, J. A. Minneapolis
 Heim, R. K. Minneapolis
 Helk, H. H. Minneapolis
 Hendrickson, J. F. Minneapolis
 Henry, C. E. Minneapolis
 Heibert, J. P. Minneapolis
 Higgins, J. H. Minneapolis
 Hill, Eleanor J. Minneapolis
 Hill, R. J. Minneapolis
 Hirschfield, Adolph. Minneapolis
 Hobbs, C. A. Minneapolis
 Hodges, S. V. Minneapolis
 Hoegh, Knut. Minneapolis
 Holen, T. Minneapolis
 Holm, Geo. A. Minneapolis
 Howe, A. W. Minneapolis
 Huenekens, E. J. Minneapolis
 Hughes, L. D. Minneapolis
 Hvostief, Jacob. Minneapolis
 Hynes, James. Minneapolis
 Hynes, John E. Minneapolis
 Ikeda, Kano. Minneapolis

Irvine, H. G. Minneapolis
 Jarvis, E. W. Minneapolis
 Jensen, M. J. Minneapolis
 Johnson, A. E. Minneapolis
 Johnson, A. E. Minneapolis
 Johnson, Carl E. Minneapolis
 Johnson, James A. Minneapolis
 Johnson, Julius. Minneapolis
 Johnson, Morton T. Minneapolis
 Johnson, Nimrod A. Minneapolis
 Johnson, Odin J. Minneapolis
 Johnson, R. A. Minneapolis
 Jones, H. W. Minneapolis
 Jones, W. A. Minneapolis
 Josewich, Alexander. Minneapolis
 Kennedy, C. C. Minneapolis
 Kennedy, James. Minneapolis
 Kennedy, R. R. Minneapolis
 Kerrick, Stanley E. Minneapolis
 Kimball, H. H. Minneapolis
 King, E. A. Minneapolis
 King, W. R. Minneapolis
 Kirmse, Geo. W. Minneapolis
 Kistler, C. M. Minneapolis
 Kistler, J. M. Minneapolis
 Knight, R. R. Minneapolis
 Knight, Ralph T. Minneapolis
 Knight, H. L. Minneapolis
 Koch, John C. Minneapolis
 Kohler, Geo. A. Minneapolis
 Koller, H. M. Minneapolis
 Koller, L. R. Minneapolis
 Kremer, Walter J. Minneapolis
 Kriedt, Daniel. Minneapolis
 Kucera, Wm. J. Hopkins
 Kusske, A. L. Minneapolis
 Lebowske, Jos. A. Minneapolis
 LaJole, J. M. Minneapolis
 LaPierre, C. A. Minneapolis
 Lane, Laura A. Minneapolis
 Laurent, A. A. Minneapolis
 Law, A. A. Minneapolis
 LaVake, R. T. Minneapolis
 Leavitt, H. H. Minneapolis
 Lee, John W. Minneapolis
 Lee, Thos. G. Minneapolis
 Leland, M. Minneapolis
 Lemstrom, Jarl. Minneapolis
 Lewis, J. D. Minneapolis
 Lind, C. J. Minneapolis
 Linner, H. P. Minneapolis
 Litchfield, John. Minneapolis
 Litzenberg, J. C. Minneapolis
 Logefell, Rudolph. Minneapolis
 Long, Jesse. Minneapolis
 Loomis, E. J. Minneapolis
 Lynch, N. J. Minneapolis
 Lundgren, A. C. Minneapolis
 Lyng, John. Minneapolis
 Lyon, J. D. Minneapolis
 Lysne, Henry. Minneapolis
 McCarthy, Donald. Minneapolis
 McDaniel Oriana. Minneapolis
 McDermott, T. E. Minneapolis
 MacDonald, C. E. Minneapolis
 McDonald, H. N. Minneapolis
 McDonald, I. C. Minneapolis
 McEachran, A. Minneapolis
 McFarland, Arthur H. Minneapolis
 McIntyre, Geo. Minneapolis
 McLaughlin, Jas. A. Minneapolis
 McKinney, F. S. Minneapolis
 MacDonald, D. A. Minneapolis
 McPheeters, H. O. Minneapolis
 Maland, D. O. Minneapolis
 Maquire, Leo. Minneapolis
 Mann, A. T. Minneapolis
 Marslay, W. J. Minneapolis
 Macnie, John. Minneapolis
 Mark, D. E. Minneapolis
 Mathews, Justus. Minneapolis
 Merkert, G. L. Minneapolis
 Mariette, E. Hopkins
 Maxelner, Stanley R. Minneapolis
 May, W. H. Minneapolis
 Mead, Marion A. Minneapolis
 Meyer, E. L. Minneapolis
 Michael, J. C. Minneapolis
 Michaelson, H. E. Minneapolis
 Michaelson, Henry E. Minneapolis
 Miller, Minneapolis
 Miller, F. C. Minneapolis
 Moir, Wm. W. Minneapolis
 Monahan, J. A. Minneapolis
 Moorehead, M. B. Minneapolis
 Moren Ed. Minneapolis
 Morrison, A. W. Minneapolis
 Morse, John H. Minneapolis
 Morton, H. McL. Minneapolis
 Murphy, I. J. Minneapolis
 Murray, Wm. R. Minneapolis
 Myers, J. A. Minneapolis
 Nelson, C. P. Owatonna
 Nelson, H. S. Minneapolis

Nelson, O. E. Minneapolis
 Newhart, Horace. Minneapolis
 Nippert, L. A. Minneapolis
 Nixon, Chas E. Minneapolis
 Noice, Russell R. Minneapolis
 Noonan, Dan F. Minneapolis
 Noran, A. N. Minneapolis
 Nordin, G. T. Minneapolis
 Nordland, Martin. Minneapolis
 Noth, H. W. Minneapolis
 Oberg, C. M. Minneapolis
 O'Donnell, J. E. Minneapolis
 Olson, Frederick A. Minneapolis
 Olson, G. M. Minneapolis
 Olson, Olaf A. Minneapolis
 Orton, H. N. Minneapolis
 Owre, Oscar. Minneapolis
 Parker, E. H. Minneapolis
 Parks, A. H. Minneapolis
 Paulson, E. L. Minneapolis
 Pearce, N. O. Minneapolis
 Pederson, R. M. Minneapolis
 Peppard, T. A. Minneapolis
 Perry, Ralph St. John. Minneapolis
 Peters, R. M. Minneapolis
 Patterson, W. E. Minneapolis
 Peterson, J. R. Minneapolis
 Peterson, O. H. Minneapolis
 Peterson, Thorvald. Minneapolis
 Pettit, C. W. Minneapolis
 Peyton, Wm. L. Minneapolis
 Phelps, Kenneth, A. Minneapolis
 Pineo, W. P. Minneapolis
 Pochler, F. T. Minneapolis
 Poppe, F. H. Minneapolis
 Pratt, Fred J. Minneapolis
 Pratt, J. A. Minneapolis
 Preine, Irvin A. Minneapolis
 Prim, J. A. Minneapolis
 Quinby, Thos. F. Minneapolis
 Quist, Henry W. Minneapolis
 Ravu, Bjarne. Minneapolis
 Reed, Chas. E. Minneapolis
 Rees, S. P. Minneapolis
 Rizer, R. J. Minneapolis
 Reynolds, J. S. Minneapolis
 Rishmiller, J. H. Minneapolis
 Roan, Carl M. Minneapolis
 Roberts, Thos. S. Minneapolis
 Roberts, W. B. Minneapolis
 Robitshek, E. C. Minneapolis
 Rochford, W. E. Minneapolis
 Rodda, F. C. Minneapolis
 Rodgers, C. L. Minneapolis
 Rosenwald, R. M. Minneapolis
 Rosen, S. Minneapolis
 Rypins, Harold. Minneapolis
 Sawatzka, Wm. A. Minneapolis
 Schaaf, Fred K. Minneapolis
 Scheefck, J. F. Minneapolis
 Scheldrup, N. M. Minneapolis
 Schmitt, Aaron F. Minneapolis
 Schneider, J. P. Minneapolis
 Schultz, F. W. Minneapolis
 Schussler, Otto F. Minneapolis
 Schwyzer, G. Minneapolis
 Seashore, Gilbert. Minneapolis
 Sedgwick, J. P. Minneapolis
 Seham, Max. Minneapolis
 Sessions, J. C. Minneapolis
 Simons, J. H. Minneapolis
 Simpson, Ellery D. Minneapolis
 Simpson, J. D. Minneapolis
 Sivertsen, Andrew. Minneapolis
 Sivertsen, Iver. Minneapolis
 Slocumb, Maude. Minneapolis
 Smith, Adam M. Minneapolis
 Smith, Art. E. Minneapolis
 Smith, Homer R. Minneapolis
 Smith, John F. Minneapolis
 Smith, Norman M. Minneapolis
 Soderlind, A. Minneapolis
 Souba, Fred J. Minneapolis
 Spratt, C. N. Minneapolis
 Staples, H. L. Minneapolis
 Stomel, Joseph. Minneapolis
 Strachauer, A. C. Minneapolis
 Strout, E. S. Minneapolis
 Strout, G. Elmer. Minneapolis
 Stuhr, Henry C. Minneapolis
 Sweetser, H. B. Minneapolis
 Swendsen, Carl G. Minneapolis
 Sweetser, Theo. Minneapolis
 Sweetzer, S. E. Minneapolis
 Taft, J. O. Minneapolis
 Taft, Walter L. Minneapolis
 Tanner, Alvin C. Minneapolis
 Taylor, Rood. Minneapolis
 Tennyson, Theo. Minneapolis
 Thomas, D. O. Minneapolis
 Thomas, Geo. E. Minneapolis
 Thomas, Geo. H. Minneapolis
 Thomas, Gilbert. Minneapolis
 Thompson, Herb. H. Minneapolis

Tigndale, A. C. Minneapolis
 Towers, F. E. Minneapolis
 Tunstead, Hugh Minneapolis
 Tyrell, C. C. Minneapolis
 Ulrich, Henry L. Minneapolis
 Undine, Clyde A. Minneapolis
 Urstad, O. H. Minneapolis
 Van Deboget, Lewis Minneapolis
 Voyer, Emile O. Minneapolis
 Waldron, C. W. Minneapolis
 Wancous, E. Z. Minneapolis
 Ward, A. W. Minneapolis
 Ward, Percy Minneapolis
 Warham, T. T. Minneapolis
 Watson, C. W. Minneapolis
 Watson, J. A. Minneapolis

Webb, R. C. Minneapolis
 Weisman, Sam Minneapolis
 Wells, H. J. Minneapolis
 Weston, C. G. Minneapolis
 Wethall, A. G. Minneapolis
 Weum, T. W. Minneapolis
 Whetstone, Mary S. Minneapolis
 White, S. Marx. Minneapolis
 White, Willard D. Minneapolis
 Wilcox, Archib. Minneapolis
 Wilcox, M. Russell. Minneapolis
 Willcutt, Clarence Minneapolis
 Williams, H. L. Minneapolis
 Williams, Robert Minneapolis
 Willson, Hugh S. Minneapolis

Wipperman, Paul Minneapolis
 Witham, C. A. Minneapolis
 Wittich, F. W. Minneapolis
 Wohlrabe, A. A. Minneapolis
 Wood, Douglas F. Minneapolis
 Woodard, F. R. Minneapolis
 Woodworth, Elizab. Minneapolis
 Wright, C. D. Minneapolis
 Wright, C. B. Minneapolis
 Wright, F. R. Minneapolis
 Wyatt, O. S. Minneapolis
 Wynne, H. M. N. Minneapolis
 Yoerg, C. W. Minneapolis
 Zaworski, E. A. Minneapolis
 Ziskin, Thos. Minneapolis

Wright County Medical Society

Regular meetings, first Monday quarterly
 Annual meeting, October

President
 Shrader, E. E. Watertown
 Secretary
 Catlin, John J. Buffalo
 Catlin, John J. Buffalo

Elleson, Frank Monticello
 Freed, O. J. R. Kokato
 Harriman, L. Howard Lake
 Hawkins, E. P. Montrose
 Metcalf, J. N. Monticello
 Moffatt, A. G. Howard Lake

Phillips, A. E. Delano
 Ridgway, A. M. Annandale
 Rosseau, Victor Maple Lake
 Roholt, C. L. Waverly
 Shrader, E. E. Watertown
 Thoresen, Th. Buffalo

Meeker County Medical Society

President
 Donavan, J. J. Litchfield
 Secretary
 Danielson, K. A. Litchfield
 Brigham, Frank Watkins

Cutts, G. A. C. Litchfield
 Danielson, K. A. Litchfield
 Donavan, J. J. Litchfield
 Delude, S. Dassel
 French, H. S. Grove City

O'Connor, D. C. Eden Valley
 Peterson, Alfred Dassel
 Robertson, A. W. Litchfield
 Robertson, W. P. Litchfield
 Sturte, J. R. Watkins

Stearns-Benton County Medical Society

Regular meetings quarterly
 Annual meeting, third Thursday in April

President
 Hempstead, Werner St. Cloud
 Secretary
 Clark, H. B. St. Cloud

Ausman, Carl F. Paynesville
 Beebe, W. L. St. Cloud
 Beaty, James H. St. Cloud
 Boehm, John C. St. Cloud
 Clark, Harry B. St. Cloud
 Dunn, J. B. St. Cloud
 Du Bois, Julian F. Sauk Center
 Du Bois, Julian A. Sauk Center

Freeman, W. L. Foley
 Friesleben, Wm. Sauk Rapids
 Guilde, W. C. St. Cloud
 Gelz, John J. Richmond
 Glycer, R. T. Broton
 Goehrs, H. W. St. Cloud
 Hempstead, Werner St. Cloud
 Holdridge, G. A. Foley
 Kuhlman, Aug. Melrose
 Lamb, Harold L. Sauk Center
 Lewis, E. J. Sauk Center
 Lewis, C. R. St. Cloud
 McDowell, J. P. St. Cloud
 Moynihan, And. F. Sauk Center

May, C. E. Masonic Temple, Minneapolis
 McKibben, W. E. St. Cloud
 Putney, Geo. W. Paynesville
 Pilon, P. C. Paynesville
 Rathburn, A. M. Rice
 Rathburn, C. A. Sauk Rapids
 Ridgway, Alex. Belgrade
 Rice, G. D. St. Cloud
 Sherwood, G. E. Kimball
 Sutton, Chas. S. St. Cloud
 Townsend, De Wayne. Belgrade
 Watson, Talbert Albant
 Wolner, Oscar H. Gilbert

Kandiyohi-Swift County Medical Society

Regular meetings, third Thursday in March, June, September and December
 Annual meeting, third Thursday in December

President
 Davison, P. C. Willmar
 Secretary
 Jacobs, John C. Willmar
 Anderson, R. E. Willmar
 Benson, I. S. Willmar
 Branton, A. F. Willmar

Branton, B. J. Willmar
 Daignault, O. Benson
 Davison, P. C. Willmar
 Ehrenberg, C. J. Willmar
 Frost, E. H. Willmar
 Hanson, H. J. New London
 Hanson, H. V. Willmar

Jacobs, Jno. C. Willmar
 Johnson, H. Kerkhoven
 Kaufman, Wm. C. Appleton
 Kolset, Carl D. Benson
 Rains, John M. Willmar
 Scofield, C. L. Benson
 Shelper, H. J. Ortonville

FIFTH DISTRICT

COUNCILOR, H. M. WORKMAN (1 year) Tracy

Camp Release District Medical Society

Renville, Chippewa, Lac Qui Parle and Sibley Counties

Regular meetings, fourth Thursday in January, April, July and October
 Annual meeting, fourth Thursday in October

President
 Adams, R. C. Bird Island
 Secretary
 Peterson, H. E. Granite Falls
 Adams, R. C. Bird Island
 Aldrich, F. R. Belview
 Bacon, R. S. Montevideo
 Bergh, L. N. Montevideo
 Barfield, J. J. Granite Falls
 Bushey, M. E. Arlington
 Brand, W. A. Redwood Falls
 Burns, M. A. Milan
 Clay, E. M. Renville
 Crandall, A. M. Madison
 Cress, E. E. Boyd

Cole, H. B. Redwood Falls
 Duclos, J. A. Henderson
 Elsenberger, G. A. Granite Falls
 Ferguson, J. B. St. Paul
 Flinn, T. E. Redwood Falls
 Flinn, B. P. Redwood Falls
 Flower, Minneapolis
 Frieck, Frank P. Gibbon
 Gaines, E. C. Buffalo Lake
 Guyer, L. G. Waseca
 Hauge, M. M. Clarkfield
 Holmberg, L. J. Canby
 Johnson, L. M. Dawson
 Jones, R. N. Gaylord
 Johnson, C. M. Dawson
 Kilbride, J. S. Canby

Lee, W. N. Madison
 Lima, Ludwig Montevideo
 Mesker, G. H. Olivia
 Mee, P. H. Osseo
 Nelson, N. A. Dawson
 Olson, W. P. Gaylord
 Peterson, H. E. Granite Falls
 Puffer, F. L. Bird Island
 Penhall, F. W. Morton
 Passer, A. A. Olivia
 Selle, Fred Winthrop
 Stemsrud, A. A. Dawson
 Smith, L. G. Montevideo
 Sherman, Franklin
 Westby, N. Madison
 Zimbach, R. D. Maynard

Redwood-Brown County Medical Society

Regular meeting, June
Annual meeting, August 10th

President
Walker, C. C. Lambertson
Secretary
Meierding, Wm. A. Springfield
Borgeson, Egbert Hanska
Dubbe, F. H. New Ulm
Eckstein, A. W. Comfrey
Gray, F. D. Marshall

Hammermeister, Theo. F. New Ulm
Haskins, J. L. Morgan
Jamieson, Earl Walnut Grove
Meierding, Wm. A. Springfield
Peland, F. J. New Ulm
Perkins, John W. Sanborn
Peterson, R. A. Vesta

Strickler, A. F. Sleepy Eye
Strickler, Mary Sleepy Eye
Sundt, Mathias Minneapolis
Schoch, J. L. New Ulm
Shrader, J. S. Springfield
Rothenburg, J. C. Springfield
Walker, C. C. Raymond
Weiser, Geo. B. New Ulm

Lyon-Lincoln County Medical Society

Regular meetings, first Tuesday in March, May and July
Annual meeting, October

President
Workman, W. E. Tracy
Secretary
Workman, H. M. Tracy
Bacon, C. G. Marshall
Bossingham, O. N. Lake Benton

Engh, Sigfred Cottonwood
Germa, Chas. Balaton
Holdale Tracy
Jacquart Tyler
Jensen, J. C. Hendricks
McCoy, J. E. Ivanhoe
Persons, C. E. Marshall

Robertson, J. B. Cottonwood
Thordarson, Theo. Minnetta
Vadheim, A. L. Tyler
Valentine, W. H. Tracy
Workman, H. M. Tracy
Workman, W. E. Tracy

SIXTH DISTRICT

COUNCILOR, F. R. WEISER (2 years) Windom

Southwestern Minnesota Medical Society

Pipestone, Rock, Murray, Nobles, Cottonwood, Jackson Counties

Regular meetings, May 12th
Annual meeting, November 10th

President
Mork, B. O. Worthington
Secretary
Piper, Wm. A. Mountain Lake
Atkins, G. L. Jackson
Arnold, E. W. Adrian
Balcom, G. G. Lake Wilson
Bong, J. H. Jasper
Brown, A. H. Pipestone
Biorn, N. A. Jackson
Chadbourne, A. G. Heron Lake
Cress, P. J. Ellsworth
De Boer, Herman. Edgerton
Dolan, C. P. Worthington
Doms, H. C. Slayton
Ditmeler, I. M. Gerber. Jasper
Dudley, J. H. Windom
Goldberg Jasper

Golden, C. M. Tyler
Hitchings, W. F. Lakefield
Hilger, J. M. Iona
Holloran, Walter Jackson
Johnson, Ellsworth Windom
Keeling, F. L. Lakefield
Leebens, J. H. Lismore
Leigh, H. J. Lakefield
Lowe, Thos. Pipestone
Lowe, Thos. A. Pipestone
McCrea, Jas. Fulda
McKeown, E. G. Pipestone
Manson, F. M. Worthington
May, C. C. Adrian
Metcalf, F. W. Worthington
Mork, B. O. Worthington
Niesbaum, W. H. Jackson
Patterson, W. E. Westbrook
Piper, Wm. A. Mountain Lake
Portman, W. C. Jackson

Richardson, W. E. Pipestone
Richmond, Chas. D. Jeffers
Rose, J. F. Lakefield
Stanley, C. R. Worthington
Sherman, C. L. Luverne
Smallwood, J. F. Worthington
Slater, A. A. Worthington
Sogge, L. Windom
Taylor, Wm. J. Pipestone
Thorson, E. O. Luverne
Tofts, Josephine Minneapolis
Tiedeman, I. D. Heron Lake
Tiedeman, E. J. Adrian
Waller, Jas. D. Wilmont
Watson, F. G. Worthington
Weiser, F. R. Windom
Williams, A. L. Slayton
Wright, C. O. Luverne
Vadheim, A. L. Tyler

Blue Earth Valley Medical Society

Martin and Faribault Counties

Regular meetings, May and October
Annual meeting, May

President
Dewey, Geo. W. Fairmont
Secretary
Hunt, R. C. Fairmont
Bailey, H. B. Ceylon
Broberg, J. A. Blue Earth
Butz, J. A. Monterey
Barr, W. H. Wells
Best, F. E. Wells

Cooper, M. D. Winnebago City
Chambers, W. C. Blue Earth
Dewey, G. W. Fairmont
Farrage, J. H. Winnebago City
Henderson, A. G. Kiester
Hunt, F. N. Fairmont
Hunt, R. C. Fairmont
Hunte, A. F. Truman
Herman, S. Welcome
Jacobs, A. C. Elmore

Johnson, H. P. Fairmont
Luedtke, G. H. Fairmont
Logan, F. W. Blue Earth
McGroarty, J. J. Easton
Malkan, M. H. Fairmont
Richardson, W. J. Fairmont
Syblrud, H. W. Briceyn
Silbernail, F. P. Elmore
Wilson, C. E. Blue Earth

Watonwan County Medical Society

Annual meeting, December

President
Hagen, O. E. Butterfield
Secretary
Grimes, H. B. Madelia

Grimes, H. B. Madelia
Hagen, O. E. Butterfield
Kabrlick, O. A. Odin
McCarthy, W. J. Madelia

Rowe, W. H. St. James
Ternstrom, O. H. St. James
Thompson, Albert St. James

SEVENTH DISTRICT

COUNCILOR, F. A. DODGE, M. D. (5 years)Le Sueur

Nicollet-Le Sueur County Medical Society

Regular meetings, September and December
Annual meeting, December

President
Aitkens, H. B.Le Sueur Center
Secretary
Le Clerc, J. E.Le Sueur
Aitkens, H. B.Le Sueur Center
Baskett, Geo. T.St. Peter

Baskett, Olive T.St. Peter
Behmler, Fred W.Lafayette
Covell, W. W.St. Peter
Daniels, J. W.St. Peter
Dodge, F. A.Le Sueur
Eirley, Clara.Mt. Pleasant, Iowa
Hartung, H. A.Le Sueur

Le Clerc, J. E.Le Sueur
McDougald, D. W.Le Sueur
Olson, R. G.Minneapolis
Phelps, R. M.St. Peter
Strathern, F. P.St. Peter
Wentworth, L. F.Le Sueur Center

McLeod County Medical Society

Regular meetings, January, April, July and October
Annual meeting, January

President
Secretary
Maurer, E. L.Brownton

Balles, D. W.Galveston, Texas
Clement, J. B.Lester Prairie
Clair, J. B.Winsted
Jellison, E. R.New Auburn
Maurer, E. L.Brownton

Kohler, E. G.Hector
Sheppard, FredHutchinson
Sheppard, P. E.Hutchinson
Tinker, C. W.Stewart

Scott-Carver Medical Society

Regular meetings, first Thursday in March, June, September and December
Annual meeting, first Thursday in December

President
Bohland, F. J.Belle Plaine
Secretary
Reiter, H. W.Shakopee
Von Bohland, F. J.Belle Plaine
Buck, Fred H.Shakopee

Cannedy, Edw. W.Prior Lake
Fischer, H. P.Shakopee
Fischer, P. M.Shakopee
Henriksen, H. G.New Market
Landenberger, John.New Prague
Maertz, W. F.New Prague
Moloney, G. R.Belle Plaine

Mulder, John L.Cavaller, N. D.
Novak, Edw. E.New Prague
Phillips, Wm. H.Jordan
Reiter, H. W.Shakopee
Schneider, H. A.Jordan
White, J. B.Belle Plaine

Goodhue County Medical Society

Regular meetings, January 12th and August 15th
Annual meeting, January

President
Secretary
Werner, N. L.Red Wing
Aanes, A. M.Red Wing

Anderson, J. V.Red Wing
Beyers, A. G.Red Wing
Claydon, L. E.Red Wing
Conley, AlvaCannon Falls
Conley, H. E.Cannon Falls
Cremer, M. H.Red Wing

Gates, J. A.Kenyon
Johnson, A. E.Red Wing
Jones, A. W.Red Wing
McGuigan, H. T.Red Wing
Werner, N. L.Red Wing

Rice County Medical Society

Regular meetings quarterly
Annual meeting, December 20th

President
Morse, W. E. H.Morristown
Secretary
Robilliard, C. M.Faribault
Babcock, F. M.Northfield
Davis, F. U.Faribault
Errickson, W. A.Faribault
Haessley, S. B.Faribault
Hanson, A. M.Faribault

Huxley, E. R.Faribault
Kanne, C. W.Faribault
Lee, W. F.Northfield
Lexa, F. J.Lonsdale
Mayland, M. L.Faribault
Morse, W. E. H.Morristown
Moses, Joseph, Jr.Northfield
Fields, MartinNorthfield
Phillips, J. G.Northfield

Plonske, C. J.Faribault
Robilliard, C. M.Faribault
Robilliard, W. H.Faribault
Rumpf, W. H.Faribault
Smith, P. A.Faribault
Theissen, W. H.Faribault
Traeger, C. A.Faribault
Warren, F. S.Faribault
Wilson, WarrenNorthfield

Wabasha County Medical Society

Regular meetings, annually first Thursday after first Monday in July

President
Branyan, HugoWabasha
Secretary
Schmidt, G.Lake City
Bayley, E. H.Lake City

Bowers, J. T.Lake City
Bowers, H. E.Lake City
Branyan, HugoWabasha
Dempsey, D. P.Kellogg
Fleischhauer, D. S.Wabasha
Radabaugh, R. C.Hastings

Rankin, A. A.Zumbro Falls
Replogle, W. H.Wabasha
Schmidt, G.Lake City
Slocumb, J. A.Plainview
Sutton, L. F.Mazeppa
Wilson, W. F.Lake City

EIGHTH DISTRICT

COUNCILOR, W. F. BRAASCH, M. D. (2 years).....Rochester

Blue Earth County Medical Society

Regular meetings, last Monday in each month
Annual meeting, last Monday in December

| | | |
|------------------------------|------------------------------------|-----------------------------------|
| President | Dahl, Gerhard A.....Mankato | Merrill, James E.....Amboy |
| Wentworth, A. J.....Mankato | Edwards, Ralph T.....Elysian | Miller, Victor.....Mankato |
| Secretary | Franchere, Fred W.....Lake Crystal | Osborn, Lida.....Mankato |
| Snell, A. M.....Mankato | Hulscher, Julian A.....Mankato | Pratt, Chelsea C.....Mankato |
| Andrews, John W.....Mankato | Holbrook, John S.....Mankato | Schlesselman, J. Theo.....Mankato |
| Andrews, Roy N.....Mankato | Holman, Carl J.....Mankato | Schmidt, Paul A.....Good Thunder |
| Benham, Edward W.....Mankato | James, John H.....Mankato | Snell, Albert M.....Mankato |
| Black, William.....Mankato | Kemp, Alphonse F.....Mankato | Schmer, Alphonse E. J.....Mankato |
| Denman, Austin V.....Mankato | Liedloff, Adolph G.....Mankato | Wentworth, Albert J.....Mankato |
| | Lloyd, Hiram J.....Mankato | Williams, Hugh O.....Mankato |

Houston-Fillmore County Medical Society

No regular meetings
Annual meeting, October

| | | |
|--------------------------------|--------------------------------|------------------------------------|
| President | Fischer, O. F.....Houston | Nass, H. A.....Mabel |
| Helland, G. M.....Houston | Foster, B. W.....Spring Valley | Onsgard, C. K.....Halstad |
| Secretary | Helland, J. W.....Spring Grove | Onsgard, L. K.....Houston |
| Fischer, O. F.....Houston | Helland, G. W.....Spring Grove | Rhines, D. C.....Caledonia |
| Anderson, Norman E.....Harmony | Kibbe, O. A.....Canton | Sather, E. R.....Spring Valley |
| Browning, W. E.....Caledonia | Kierland, P. E.....Harmony | Tierney, C. M.....Granger |
| Christianson, H. W.....Wykoff | Lannin, J. C.....Mabel | Williams, R. V.....Rushford |
| Drake, F. A.....Lanesboro | Love, Geo. A.....Preston | Utley, J. D.....Santa Monica, Cal. |
| | Nelson, M. S.....Spring Grove | |

Mower County Medical Society

Regular meetings, second Wednesday in January, April, July and October
Annual meeting, second Wednesday in October

| | | |
|-------------------------|-------------------------|---------------------------|
| President | Grise, W. B.....Austin | Morris, E. H.....Austin |
| Morris, E. H.....Austin | Hegge, C. A.....Austin | Morse, M. P.....LeRoy |
| Secretary | Hegge, O. H.....Austin | Melzer, G. R.....Lyle |
| Lommen, P. A.....Austin | Hertel, G. A.....Austin | Shottler, G. L.....Dexter |
| Allen, A. W.....Austin | Henslin, A. E.....LeRoy | Shipley, H. M.....Adams |
| Baker, C. L.....Austin | Leck, C. C.....Austin | Torkelson, P. T.....Lyle |
| | Lomman, P. A.....Austin | Warren, C. L.....LeRoy |

Dodge County Medical Society

No regular meetings
Annual meeting in August

| | | |
|---------------------------------|-----------------------------------|------------------------------------|
| President | Adams, Rollin T.....Mantorville | Clifford, Frank F.....West Concord |
| Harrison, E. E.....West Concord | Baker, Amos L.....Kasson | Harrison, Elmer E.....West Concord |
| Secretary | Belt, Wallace E.....Dodge Center | Smith, Frank D.....Kasson |
| Bigelow, C. E.....Dodge Center | Bigelow, Chas. E.....Dodge Center | Way, Osman F.....Claremont |

Olmstead County Medical Society

Regular meetings, second Wednesday in April, June, September and December
Annual meeting, second Wednesday in December

| | | |
|---------------------------------|-----------------------------------|-----------------------------------|
| President | Bonta, M. B.....Rochester | Heyersdale, Oscar C.....Rochester |
| Joyce, Geo. T.....Rochester | Boothby, Walter M.....Rochester | Howard, S. E.....Rochester |
| Secretary | Bowning, Harry H.....Rochester | Hundling, H. W.....Rochester |
| Piper, M. C.....Rochester | Braasch, Wm. F.....Rochester | Hunt, Verne C.....Rochester |
| Abrams, W. D.....Rochester | Bradley, E. L.....Rochester | Hutchinson, C. J.....Rochester |
| Adson, Alfred W.....Rochester | Gaarde, Fred W.....Rochester | Hyer, C. A.....Rochester |
| Allen, Wilson A.....Rochester | Giffin, H. Z.....Rochester | Johnson, A. C.....Rochester |
| Amber, S.....Rochester | Goeckerman, W. H.....Rochester | Jopson, P. N.....Rochester |
| Anderson, C. N.....Rochester | Graham, Christopher.....Rochester | Jones, H. T.....Rochester |
| Andres, R. G.....Rochester | Granger, G. Booker.....Rochester | Joseph, E. G.....Rochester |
| Andrews, C. F.....Rochester | Granger, Charles T.....Rochester | Joyce, George.....Rochester |
| Anderson, F. W.....Rochester | Greenfield, W. J.....Rochester | Judd, Edward S.....Rochester |
| Asbury, J. T.....Rochester | Grigsby, R. O.....Rochester | Keith, N. M.....Rochester |
| Baird, B. A.....Rochester | Haines, S. F.....Rochester | Kilbourne, Arthur F.....Rochester |
| Baker, C. E.....Rochester | Hallberg, C. A.....Rochester | Brock, S.....Rochester |
| Balfour, Donald C.....Rochester | Hallenbeck, Dorr F.....Rochester | Broders, Albert C.....Rochester |
| Barlow, Roy A.....Rochester | Hardt, L. L.....Rochester | Brown, P. W.....Rochester |
| Baughn, H. A.....Rochester | Harrington, S. W.....Rochester | Brown, S. E.....Rochester |
| Benedict, Wm. L.....Rochester | Hartman, Howard R.....Rochester | Bryan, A. W.....Rochester |
| Benjamin, W. G.....Rochester | Hedblom, Carl A.....Rochester | Bule, Louis A.....Rochester |
| Berkman, David M.....Rochester | Helmholz, H. F.....Rochester | Bumpus, Herman C.....Rochester |
| Bianco, P.....Rochester | Hempstead.....Rochester | Busman, George W.....Rochester |
| Bleifus, Walter F.....Rochester | Henderson, Melvin S.....Rochester | Cathcart, E. P.....Rochester |

Chaney, R. H. Rochester
 Chaney, W. C. Rochester
 Conner, H. M. Rochester
 Copenhaver, N. H. Rochester
 Crenshaw, John L. Rochester
 Crewe, John E. Rochester
 Culligan, J. M. Rochester
 DesBrisay, H. A. Rochester
 Desjardins, Arthur U. Rochester
 Drips, D. G. Rochester
 Dolder, Felix C. Eyota
 Doyle, J. B. Rochester
 Eager, B. F. Rochester
 Eusterman, George B. Rochester
 Evarts, Arrah B. Rochester
 Fardy, M. J. Rochester
 Fawcett, Charles E. Stewartsville
 Fineman, S. Rochester
 Fltz, R. Rochester
 Foucar, H. O. Rochester
 Fowler, L. H. Rochester
 Frazer, E. B. Rochester
 King, C. P. Rochester
 Kinsella, T. J. Rochester
 Knauf, A. R. Rochester
 Koons, K. M. Rochester
 Lange, A. E. Rochester
 Lemon, Willis S. Rochester
 Lillie, Harold L. Rochester
 Lillie, Walter I. Rochester
 Linton, Wm. B. Rochester
 Lippman, H. S. Rochester
 Logan, Archibald H. Rochester
 Long, W. H. Rochester
 Lynch, G. V. Rochester

Lyons, Horace R. Rochester
 McCartney, J. S. Minneapolis
 McCorvie, J. E. Rochester
 McGuire, L. D. Rochester
 Magath, T. B. Rochester
 Masson, James C. Rochester
 Masson, D. M. Rochester
 Mastin, Edward V. Rochester
 Mayo, Charles H. Rochester
 Mayo, W. J. Rochester
 Meeker, W. R. Rochester
 Melson, Oliver C. Rochester
 Meyerding, Henry W. Rochester
 Mitchell, J. I. Rochester
 Moersch, H. J. Rochester
 Moersch, Frederick P. Rochester
 Moore, T. D. Rochester
 Moore, Alex B. Rochester
 Murphy, L. T. Rochester
 Mussey, Robert D. Rochester
 New, Gordon B. Rochester
 Ohlinger, Lorin B. Rochester
 O'Leary, Paul A. Rochester
 Osborne, E. D. Rochester
 Ott, William Rochester
 Pardee, K. Rochester
 Parker, E. R. Rochester
 Parker, H. L. Rochester
 Pemberton, John deJ. Rochester
 Piper, Monte C. Rochester
 Plummer, H. S. Rochester
 Plummer, W. A. Rochester
 Pollock, Lee W. Rochester
 Powell, L. D. Rochester
 Prangen, Avery D. Rochester

Proctor, O. S. Rochester
 Rankin, F. W. Rochester
 Renshaw, K. Rochester
 Rice, G. E. Rochester
 Rockwell, D. C. Rochester
 Rosenow, Edward C. Rochester
 Ross, J. W. Rochester
 Rowley, Walter Rochester
 Rowntree, L. S. Rochester
 Russell, Herman R. Stewartsville
 Sanford, Arthur H. Rochester
 School, A. J. Rochester
 Schoonover, F. S. Rochester
 Senty, E. J. Rochester
 Sheldon, Walter D. Rochester
 Sistrunk, Walter E. Rochester
 Smith, F. L. Rochester
 Stacy, Leda June Rochester
 Steven, George Byron
 Stokes, John H. Rochester
 Szaplai, T. L. Rochester
 Taylor, R. V. Rochester
 Vinson, Porter P. Rochester
 Wagoner, H. P. Rochester
 Walters, W. Rochester
 Weir, J. F. Rochester
 Wilder, Russel M. Rochester
 Wilhelm, L. F. X. Rochester
 Williams, Frederick A. Rochester
 Wilkins, J. A. Rochester
 Wilson, Louis B. Rochester
 Winter, M. D. Rochester
 Witherstine, H. H. Rochester
 Woltman, Henry W. F. Rochester
 Young, T. O. Rochester

Waseca County Medical Society

Annual meeting, December

President
 Lynn, J. F. Waseca
 Secretary
 Miller, H. A. Waseca
 Blanchard, H. G. Waseca

Brandenberg, F. D. New Richland
 Chamberlain, W. A. Waseca
 Cory, W. H. Waterville
 Hagen, H. O. New Richland
 Joyce, I. M. Janesville
 Gallagher, B. H. Waseca

Lynn, J. F. Waseca
 Miller, H. A. Waseca
 McIntire, H. M. Waseca
 O'Hara, J. J. Janesville
 Swartwood, F. A. Waseca

Winona County Medical Society

Regular meetings, first Tuesday in January, April, July, October
 Annual meetings in January

President
 Lichtenstein, Hans Winona
 Secretary
 Robbins, C. P. Winona
 Benoit, R. F. Winona
 Clay, F. H. St. Charles
 Helise, W. F. C. Winona
 Keyes, E. D. Winona

Leicht, O. Winona
 Lester, C. A. Winona
 Lichtenstein, H. Winona
 Lindsay, W. V. Winona
 Lynch, J. L. Winona
 McLaughlin, E. M. Winona
 Nauth, W. W. Winona
 Neumann, C. A. St. Charles

Pritchard, D. B. Winona
 Risser, E. D. Winona
 Robbins, C. P. Winona
 Rosenberry, B. P. Winona
 Schaefer, S. Winona
 Scott, J. W. St. Charles
 Steiner, I. W. Winona
 Tweedy, G. J. Winona

Freeborn County Medical Society

Regular meetings upon call of members
 Annual meeting, November

President
 Von Berg, J. P. Albert Lea
 Secretary
 Vollum, E. O. Albert Lea
 Burns, H. D. Albert Lea

Butruff, C. R. Freeborn
 Calhoun, F. W. Albert Lea
 Folken, G. F. Albert Lea
 Gullixson, A. Albert Lea
 Kamp, B. A. Albert Lea
 Nannestad, J. R. Albert Lea

Palmer, W. L. Albert Lea
 Shultz, J. A. Albert Lea
 Stevenson, R. G. Albert Lea
 Stewart, O. E. Albert Lea
 Vollum, E. O. Albert Lea
 Von Berg, J. P. Albert Lea

Steele County Medical Society

Regular meetings, first Tuesday of each month
 Annual meetings in December

President
 Daily, W. J. Blooming Prairie
 Secretary
 Andrist, J. W. Owatonna
 Adair, J. H. Owatonna
 Andrist, J. W. Owatonna

Daily, W. J. Blooming Prairie
 Ertel, E. Q. Ellendale
 Hart, A. B. Owatonna
 Melby, B. Blooming Prairie
 Morehouse, G. G. Owatonna
 Peterson, C. Owatonna

Senn, E. W. Owatonna
 Smersh, F. M. Owatonna
 Smersh, J. F. Owatonna
 Stewart, A. B. Owatonna
 Thimsen, N. C. Blooming Prairie
 Warren, J. W. Minneapolis

ALPHABETICAL ROSTER

Aanes, A. M. Red Wing
 Abbott, J. S. St. Paul
 Abbott, Wm. P. Duluth
 Abbott, A. W. Minneapolis
 Aborn, W. H. Hawley
 Abramovich, J. H. St. Paul
 Abrams, W. D. Rochester
 Adair, F. L. Minneapolis
 Adair, J. H. Owatonna
 Adams, B. S. Hibbing
 Adams, R. C. Bird Island
 Adams, Rollin T. Mantorville
 Adkins, C. M. Thief River Falls
 Adson, Alfred W. Rochester
 Ahrens, A. E. St. Paul
 Ahrens, A. H. St. Paul
 Aitkens, H. B. Le Sueur Center
 Alden, J. F. St. Paul
 Aldes, Harry St. Paul
 Aldrich, F. R. Belview
 Alexander, F. H. St. Paul
 Aling, C. P. Minneapolis
 Allen, H. W. Minneapolis
 Allen, F. H. Staples
 Allen, A. W. Austin
 Allen, Mason St. Paul
 Allen, Wilson A. Rochester
 Alquist, H. E. Minneapolis
 Alymer, A. L. Minneapolis
 Amber, S. Rochester
 Ancker, A. B. St. Paul
 Anderson, C. N. Rochester
 Anderson, H. C. St. Paul
 Anderson, Norman E. Harmony
 Anderson, J. V. Red Wing
 Anderson, F. W. Rochester
 Anderson, R. E. Willmar
 Anderson, A. E. Minneapolis
 Anderson, Arnt Minneapolis
 Anderson, J. D. Minneapolis
 Anderson, James K. Minneapolis
 Andres, R. G. Rochester
 Andrews, C. F. Rochester
 Andrews, John W. Mankato
 Andrews, Roy N. Mankato
 Andrist, J. W. Owatonna
 Annis, H. E. Minneapolis
 Archibald, C. M. Mahanomen
 Arends, A. L. St. Paul
 Arey, H. C. Excelsior
 Arminen, K. V. Duluth
 Armstrong, J. M. St. Paul
 Arnold, E. W. Adrian
 Arnsen, J. M. Graceville
 Arouni, Khalil St. Paul
 Artz, C. F. St. Paul
 Asbury, J. T. Rochester
 Atkins, G. L. Jackson
 Aune, Martin Minneapolis
 Aurand, W. H. Minneapolis
 Aurness, P. A. Minneapolis
 Ausman, Carl F. Paynesville
 Austin, E. E. Minneapolis
 Avery, J. F. Minneapolis
 Ayers, G. T. Ely
 Babcock, F. M. Northfield
 Bacon, C. G. Marshall
 Bacon, H. P. Milaca
 Bacon, Knox St. Paul
 Bacon, L. C. St. Paul
 Bacon, R. S. Montevideo
 Badeaux, G. L. Brainerd
 Bagley, W. R. Duluth
 Baier, Florence Minneapolis
 Bailey, H. B. Ceylon
 Baird, E. A. Rochester
 Baker, A. C. Fergus Falls
 Baker, Amos L. Kasson
 Baker, C. L. Austin
 Baker, A. T. Minneapolis
 Baker, C. E. Rochester
 Baker, E. L. Minneapolis
 Baker, Harry A. Minneapolis
 Baker, Loos Minneapolis
 Bakke, G. H. Minneapolis
 Balcom, G. G. Lake Wilson
 Balcome, F. E. St. Paul
 Baldwin, L. B. Minneapolis
 Baldwin, O. J. Chisholm
 Baldwin, W. P. Stephen
 Balfour, Donald C. Rochester
 Ball, C. R. St. Paul
 Balles, D. W. Galveston, Tex.
 Bank, H. E. Minneapolis
 Barfield, J. J. Granite Falls
 Barlow, Roy A. Rochester
 Barney, L. A. Duluth
 Barr, W. H. Wells

Barner, Henry Adolph Minneapolis
 Barron, Moses Minneapolis
 Barry, L. W. St. Paul
 Barsness, Nellie St. Paul
 Barten, E. R. Minneapolis
 Baskett, Geo. T. St. Peter
 Baskett, Olive T. St. Peter
 Bass, C. W. Minneapolis
 Bates, B. Wheaton
 Baughn, H. A. Rochester
 Baxter, S. H. Minneapolis
 Bayley, E. H. Lake City
 Beadle, W. D. St. Paul
 Beals, Hugh St. Paul
 Beard, Archie Minneapolis
 Beaty, James H. St. Cloud
 Beaudoux, Henry A. Minneapolis
 Beckley, F. L. St. Paul
 Beebe, W. L. St. Cloud
 Behmler, Fred W. Lafayette
 Beise, R. A. Brainerd
 Burns, M. A. Milan
 Burns, R. M. St. Paul
 Buscher, H. St. Paul
 Bushey, M. E. Arlington
 Busman, George W. Rochester
 Butler, John Minneapolis
 Buttruff, C. R. Freeborn
 Butz, J. A. Monterey
 Byrnes, W. J. Minneapolis
 Bell, J. W., Jr. Minneapolis
 Bell, J. W., Sr. Minneapolis
 Belt, Wallace E. Dodge Center
 Benedict, Wm. L. Rochester
 Benham, Edward W. Mankato
 Benjamin, A. E. Minneapolis
 Benjamin, W. G. Rochester
 Benedict, E. E. Minneapolis
 Benn, F. G. Minneapolis
 Bennepe, L. M. St. Paul
 Bennion, P. H. St. Paul
 Benoit, R. F. Winona
 Benson, Geo. E. Minneapolis
 Benson, I. S. Willmar
 Benson, R. D. Minneapolis
 Bentley, Norman P. St. Paul
 Bergh, L. N. Montevideo
 Berghelm, M. C. Hawley
 Berkman, David M. Lake Park
 Bernard, E. C. Duluth
 Bergquist, K. E. Duluth
 Berrisford, Paul D. St. Paul
 Bertelson, O. L. Crookston
 Bessesen, A. N. Minneapolis
 Best, F. E. Wells
 Beyers, A. G. Red Wing
 Biederman, Jacob Thief River Falls
 Bigelow, Chas. E. Dodge Center
 Binet, H. E. Grand Rapids
 Binger, H. E. St. Paul
 Bjorn, N. A. Jackson
 Birnberg, T. L. St. Paul
 Bishop, Chas. W. Minneapolis
 Bissell, F. S. Minneapolis
 Boyer, S. H. Duluth
 Black, William Mankato
 Blake, James Hopkins
 Blakely, C. C. Barnum
 Blanchard, H. G. Waseca
 Blanco, P. Rochester
 Blegen, H. M. Warren
 Bleifuss, Walter F. Rochester
 Bock, R. A. St. Paul
 Bockman, M. Minneapolis
 Boeckmann, Eduard St. Paul
 Boeckmann, Egil St. Paul
 Boehm, John C. St. Cloud
 Bohland, E. H. St. Paul
 Bohling, E. S. Sandstone
 Bole, R. S. St. Paul
 Boleyn, E. S. St. Paul
 Bolstad, Chas. Ortonville
 Bolstad, H. C. St. Paul
 Bone, Merle Kelliher
 Bong, J. H. Jasper
 Bonta, M. B. Rochester
 Booth, A. E. Minneapolis
 Boothby, Walter M. Rochester
 Boquist, E. T. W. Minneapolis
 Boreen, C. A. Minneapolis
 Borgeson, Egbert Hanska
 Borgeson, S. Bemidji
 Bossingham, O. N. Lake Benton
 Bosworth, Robinson St. Paul
 Bottolfsen, B. T. Moorhead
 Bowers, H. E. Lake City

Bowers, J. T. Lake City
 Bowman, H. A. Minneapolis
 Bowman, P. G. Duluth
 Bowring, Harry H. Rochester
 Boysen, P. Pelican Rapids
 Braasch, Wm. F. Rochester
 Brabec, F. J. Perham
 Braden, A. J. Duluth
 Bradley, E. L. Rochester
 Brand, G. D. St. Paul
 Brand, W. A. Redwood Falls
 Branderberg, F. D. New Richland
 Branton, A. F. Willmar
 Branton, B. J. Willmar
 Branyan, Hugo Wabasha
 Bratrud, Arthur F. Minneapolis
 Bratrud, E. Warren
 Bratrud, Theo. Warren
 Bray, C. W. Biwabik
 Bray, E. R. St. Paul
 Briggs, F. W. Duluth
 Brigham, Frank Watkins
 Brimhall, J. B. St. Paul
 Broberg, J. A. Blue Earth
 Brock, S. Rochester
 Broders, Albert C. Rochester
 Brodie, Walter D. St. Paul
 Broker, W. S. Minneapolis
 Brooks, Chas. W. Minneapolis
 Brooks, D. F. Rochester
 Brown, A. H. Pipestone
 Brown, Edwin D. Minneapolis
 Brown, Edw. I. St. Paul
 Brown, E. J. Minneapolis
 Brown, John C. St. Paul
 Brown, LeRoy St. Paul
 Brown, Lyle L. Crookston
 Brown, Paul F. Minneapolis
 Brown, P. W. Rochester
 Brown, R. S. Minneapolis
 Brown, Silas E. St. Paul
 Brown, S. E. Rochester
 Browning, W. E. Caledonia
 Brunet, L. M. Cloquet
 Bryan, A. W. Rochester
 Buck, Fred H. Shakopee
 Buckley, E. W. St. Paul
 Buie, Louis A. Rochester
 Bulkey, Kenneth Minneapolis
 Bullen, F. W. Hibbing
 Bumpus, Herman C. Rochester
 Burfiend, G. H. St. Paul
 Burch, F. E. St. Paul
 Burnap, W. L. Fergus Falls
 Burns, F. W. St. Paul
 Burns, H. D. Albert Lea
 Burns, H. J. Duluth
 Cabet, V. S. Minneapolis
 Caine, C. E. Morris
 Calhoun, F. W. Albert Lea
 Cameron, J. A. St. Paul
 Camp, Walter E. Minneapolis
 Campbell, A. A. Ogema
 Campbell, E. Paul St. Paul
 Cawlaw, C. M. Minneapolis
 Campbell, J. E. South St. Paul
 Campbell, Lowell N. Minneapolis
 Campbell, Robert Minneapolis
 Cannedy, Edw. W. Prior Lake
 Cannon, C. M. St. Paul
 Cannon, Harry St. Paul
 Cantwell, W. F. Little Fork
 Carey, Jas. B. Minneapolis
 Carman, C. L. St. Paul
 Carman, Paul I. St. Paul
 Carmen, J. E. Detroit
 Carroll, Wm. C. St. Paul
 Carlsons, C. F. Hibbing
 Cathcart, E. P. Rochester
 Catlin, John J. Buffalo
 Catlin, T. J. Palisade
 Cavanaugh, J. O. St. Paul
 Cavanor, F. T. Minneapolis
 Chadbourne, A. G. Heron Lake
 Chamberlain, W. A. Waseca
 Chambers, W. C. Blue Earth
 Chandler, O. B. St. Paul
 Chaney, R. H. Rochester
 Chaney, W. C. Rochester
 Chapman, T. L. Duluth
 Chatterton, C. C. St. Paul
 Cheleen, S. J. Minneapolis
 Cheney, E. L. Duluth
 Chowning, Wm. Minneapolis
 Christenson, C. R. Morris
 Christison, J. T. St. Paul
 Christiansen, A. St. Paul
 Christianson, H. W. Wykoff

Christie, G. R.....Long Prairie
Churchill, A. G.....St. Paul
Cirkler, A. A.....Minneapolis
Clair, J. B.....Winnetka
Clark, C. N.....Galup, New Mexico
Clark, F. F.....Duluth
Clark, G. E.....Stillwater
Clark, Harry B.....St. Cloud
Clark, Howard S.....Minneapolis
Clark, Lenna E. Galup, New Mex.
Clark, T. C.....Soldiers' Home, Minneapolis
Clay, E. M.....Renville
Clay, F. H.....St. Charles
Claydon, L. E.....Red Wing
Clement, J. B.....Lester Prairie
Clifford, Frank F.....West Concord
Clifton, T. A.....Isanti
Cobb, S. G.....St. Paul
Cole, H. B.....Redwood Falls
Cole, Wallace.....St. Paul
Collie, H. G.....St. Paul
Collins, A. N.....Duluth
Collins, H. C.....Duluth
Colvin, A. R.....St. Paul
Comstock, A. E.....St. Paul
Condit, W. N.....Minneapolis
Conley, Alva.....Cannon Falls
Conley, H. E.....Cannon Falls
Conner, H. M.....Rochester
Connor, C. E.....St. Paul
Cook, H. W.....Minneapolis
Cook, Paul B.....St. Paul
Cooney, H. C.....Princeton
Cooper, M. D.....Winnebago City
Copenhaver, N. H.....Rochester
Corbett, J. Frank.....Minneapolis
Corrigan, J. E.....Spoonerville
Corniea, A. D.....St. Paul
Cory, W. H.....Waterville
Cosgrove, J. H.....Duluth
Courtney, Walter.....Brainard
Covell, W. W.....St. Peter
Coventry, W. A.....Duluth
Cowern, E. W.....North St. Paul
Cowing, P. G.....Evansville
Cozman, E. O.....Minneapolis
Crafts, L. N.....Minneapolis
Craig, C. C.....International Falls
Crandall, A. N.....Madison
Cranmer, Richard R. Minneapolis
Craw, Verne C.....Bertha
Cremer, M. H.....Red Wing
Crenshaw, John L.....Rochester
Cress, E. E.....Boyd
Cress, P. J.....Ellsworth
Crewe, John E.....Rochester
Cross, John G.....Minneapolis
Crowe, J. H.....Virginia
Crums, Geo. F.....Minneapolis
Culligan, J. M.....Rochester
Curtin, John F.....Minneapolis
Cutts, Geo.....Minneapolis
Cutts, G. A. C.....Litchfield

Dack, L. G.....St. Paul
Dahl, Elmer O.....Minneapolis
Dahl, Gerhard A.....Mankato
Dahl, John A.....Minneapolis
Dahlstrom, A. W.....Minneapolis
Daignault, O.....Benson
Dally, W. J.....Bloomington
Dampier, C. E.....Crookston
Daniel, Donald H.....Minneapolis
Daniels, J. W.....St. Peter
Daniels, W. H.....Crookston
Danielson, K. A.....Litchfield
Dane, F. L.....Wadena
Darling, J. B.....St. Paul
Darrow, C. C.....Moorhead
Dart, L. D.....Minneapolis
Daugherty, E. B.....St. Paul
Daugherty, L. E.....St. Paul
Davis, B. F.....Duluth
Davis, F. U.....Faribault
Davis, Herbert.....St. Paul
Davis, H. S.....Duluth
Davis, T. C.....Glenwood
Davis, William.....St. Paul
Davison, P. C.....Willmar
De Boer, Herman.....Edgerton
Dedolph, K.....St. Paul
Dempsey, D. P.....Kellogg
Denman, Austin V.....Mankato
Dennis, W. A.....St. Paul
DesBrisay, H. A.....Rochester
Desjardins, Arthur U. Rochester
Dewey, G. W.....Fairmont
Deziel, G.....Minneapolis
Dickson, Thos. H., Jr.....St. Paul
Disen, C. F.....Minneapolis
Dittmeier, I. M. Gerber.....Jasper
Dittman, Geo. C.....St. Paul
Dodge, F. A.....Le Sueur

Dohm, A. J.....St. Paul
Dolan, C. P.....Worthington
Dolder, Felix C.....Eyota
Doms, H. C.....Slayton
Donaldson, C. A.....Minneapolis
Donavon, J. J.....Litchfield
Doolittle, E. L.....Duluth
Dorge, Richard.....Minneapolis
Dornblaser, H. Bright Minneapolis
Douglas, H. E.....Blackduck
Douglas, J. E.....State Sanitorium
Doxey, G. L.....Minneapolis
Doyle, J. B.....Rochester
Drake, Carl B.....St. Paul
Drake, F. A.....Lanesboro
Drake, Chas. R.....Minneapolis
Dredge, H. P.....Sandstone
Drenning, F. C.....Duluth
Driesbach, N.....Minneapolis
Drips, D. G.....Rochester
Drought, W. W.....Fergus Falls
Dryden, F. M.....Crookston
Dubbe, F. H.....New Ulm
Du Bois, Julian A.....Sauk Center
Du Bois, Julian F.....Sauk Center
Duclos, J. A.....Henderson
Dudley, J. H.....Windom
Dulude, S.....Dassel
Dunlop, Alex.....Crookston
Dunn, Geo. Robert.....Minneapolis
Dunn, J. B.....St. Cloud
Dunn, J. N.....St. Paul
Dunn, Lewis.....Minneapolis
Dunsmoor, P. A.....Minneapolis
Durgon, F. L.....Nopemung
Dutton, E. C.....Minneapolis

Earl, Geo. A.....St. Paul
Earl, Robert C.....St. Paul
Eager, B. F.....Rochester
Eberlin, E. A.....Glenwood
Eckstein, A. W.....Comfrey
Edwards, Ralph T.....Elysian
Egan, John M.....Minneapolis
Eggen, O. K.....Minneapolis
Eklund, Kristian.....Minneapolis
Ehrenberg, C. J.....Willmar
Eirley, Clara.....Mt. Pleasant, Ia.
Eisengraber, G. A.....Granite Falls
Eisenman, W. F.....Chisholm
Eisler, Edwin R.....Minneapolis
Eitel, G. G.....Minneapolis
Ekblad, J. W.....Duluth
Eklund, J. J.....Duluth
Eklund, W. J.....Duluth
Elias, F. J.....Duluth
Elleson, Frank.....Monticello
Else, J. R.....Glenwood
Ely, O. S.....South St. Paul
Erb, Fred A.....Minneapolis
Engberg, E. J.....St. Paul
Engl, Sigfred.....Cottonwood
Ericson, John G.....Minneapolis
Erickson, W. A.....Faribault
Ernest, G. C.....St. Paul
Ertel, E. Q.....Ellendale
Esheby, E. C.....St. Paul
Esser, John.....Perham
Estrem, C. O.....Fergus Falls
Eusterman, George B. Rochester
Evarts, Arah B.....Rochester
Everlof, J. L.....Minneapolis
Evert, John A.....St. Paul
Ewing, C. F.....Wheaton

Fahey, E. W.....Duluth
Fankbner, A. V.....Mottley
Fankner, W. A.....Minneapolis
Fardy, M. J.....Rochester
Farr, R. E.....Minneapolis
Farrage, J. H. Winnebago City
Fawcett, Charles E. Stewartville
Feidt, W. W.....Minneapolis
Ferguson, J. B.....St. Paul
Ferguson, J. C.....St. Paul
Fields, Martin.....Northfield
Fineman, S.....Rochester
Fischer, G. C.....Minneapolis
Fischer, H. P.....Shakopee
Fischer, O. F.....Houston
Fischer, P. M.....Shakopee
Fisher, L. F.....Thief River Falls
Fitz, R.....Rochester
Fitzgerald, D.....Minneapolis
Fitzgerald, E. T.....Morris
Fjellman, R. C.....Minneapolis
Fjelstad, C. Alfred Minneapolis
Fleischhauer, D. S.....Wabasha
Fleming, A. S.....Minneapolis
Fleming, J.....Cloquet
Flinn, B. P.....Redwood Falls
Flinn, T. E.....Redwood Falls
Floeken, Chas. F.....Minneapolis

Flom, A. O.....Chisago City
Flower, W. Z.....Minneapolis
Fogarty, C. W.....St. Paul
Folken, G. F.....Albert Lea
Forbes, R. S.....Duluth
Forrest, C. G.....Clearbrook
Foster, B. W.....Spring Valley
Foucar, H. O.....Rochester
Fowler, L. H.....Rochester
Fox, John M.....Minneapolis
Franchere, F. W.....Lake Crystal
Franzen, H. C.....Minneapolis
Fraser, Geo. W.....Duluth
Fraser, E. B.....Rochester
Freeborn, J. B.....Fergus Falls
Freed, O. J. R.....Cokato
Freeman, C. D.....St. Paul
Freeman, W. L.....Foley
Freiligh, E. O. B.....Stillwater
French, H. S.....Grove City
Frieich, Frank P.....Gibson
Friesleben, Wm.....Sauk Rapids
Froelich, H. W. Thief River Falls
Frost, E. H.....Willmar
Fulton, J. F.....St. Paul
Furber, W. W.....Cottage Grove

Gaarde, Fred W.....Rochester
Gager, E. C.....St. Paul
Gaines, E. C.....Buffalo Lake
Gallagher, B. H.....Waseca
Gardner, E. L.....Minneapolis
Garlock, A. V.....Bemidji
Gates, J. A.....Kenyon
Gauthier, W.....Virginia
Geer, Everett K.....St. Paul
Geissinger, John D.....St. Paul
Geist, Emil.....Minneapolis
Geist, Geo. A.....St. Paul
Gelz, John J.....Richmond
Gendron, J. F.....Grand Rapids
Germo, Chas.....Balaton
Ghent, Harry.....St. Paul
Ghent, M. M.....St. Paul
Ghostly, Mary.....Internat'l Falls
Gibbon, L. L.....Lowry
Giere, E. O.....St. Paul
Giesler, Paul W.....Minneapolis
Giffin, H. Z.....Rochester
Gilbert, J. R.....Carlton
Gillilan, J. S.....St. Paul
Gillinson, A. J.....Osakis
Gilles, L. L.....Minneapolis
Gillespie, N. H.....Duluth
Gilmore, R.....Bemidji
Ginsberg, Wm.....St. Paul
Glyer, R. T.....Brooten
Goekerman, W. H.....Rochester
Goehrs, H. W.....St. Cloud
Goldberg, M. L.....Jasper
Golden, C. M.....Tyler
Goitz, E. V.....St. Paul
Goodman, C. E.....Virginia
Gordon, G. J.....Minneapolis
Gosin, D. F.....Minneapolis
Goss, Harold J.....Rochester
Gosslee, G. L.....Moorhead
Gotham, C. L.....St. Paul
Gowdy, R. A.....Alexandria
Graham, Christopher.....Rochester
Graham, David.....Duluth
Graham, Reginald.....Duluth
Graham, Robert.....Duluth
Granger, Charles T.....Rochester
Granger, G. Booker.....Rochester
Gratzek, Thos.....St. Paul
Graves, C.....Aitkin
Graves, Floyd.....Minneapolis
Grawn, F. A.....Duluth
Gray, Clyde E.....Rush City
Gray, F. D.....Marshall
Greeley, L. Q.....Duluth
Green, E. K.....Minneapolis
Greene, C. L.....St. Paul
Greenfield, W. J.....Rochester
Griffin, P. J.....Fertile
Grigsby, R. O.....Rochester
Grimes, H. B.....Madelia
Grise, W. B.....Austin
Groll, S. J.....Minneapolis
Groun, H. T.....Virginia
Gruenhagen, Arnold P. St. Paul
Guilford, H. M.....Rochester
Gulde, W. C.....St. Cloud
Gullixson, A.....Albert Lea
Gunderson, Harley J. Minneapolis
Gunderson, R. M.....Lake Park
Guyer, L. G.....Waseca

Hacking, Frank.....Minneapolis
Haessley, S. B.....Faribault
Hagaman, Geo. K.....St. Paul
Hagen, G. L.....Minneapolis
Hagen, H. O.....New Richland

Hagen, O. E. Butterfield
Hagen, O. J. Moorhead
Haggard, G. D. Minneapolis
Haight, G. G. Audubon
Haines, J. H. Stillwater
Haines, S. F. Rochester
Halenback, P. L. Crosby
Hall, A. R. St. Paul
Hall, A. E. Cusson
Hall, J. N. Minneapolis
Hall, P. M. State Sanatorium
Hallberg, C. A. Rochester
Hallenbeck, Dorr F. Rochester
Halloran, Walter. Jackson
Hallowell, W. H. Minneapolis
Hamel, Arnold L. Minneapolis
Hamel, C. F. Minneapolis
Hamilton, A. S. Minneapolis
Hammermeister, Theo. F.
New Ulm
Hammes, E. M. St. Paul
Hammond, J. F. St. Paul
Hand, W. R. Elbow
Haney, C. L. Duluth
Hansen, Erling. Minneapolis
Hanson, A. M. Faribault
Hanson, H. J. New London
Hanson, H. V. Willmar
Hanson, Olga. Minneapolis
Hardt, L. L. Rochester
Hare, E. R. Minneapolis
Harriman, L. Howard Lake
Harrington, C. D. Minneapolis
Harrington, S. W. Rochester
Harrison, Elmer E. West Concord
Hart, A. B. Owatonna
Hartig, Hugo J. Minneapolis
Hartman, Howard R. Rochester
Hartung, H. A. Le Sueur
Hartzell, Thos. B. Minneapolis
Haskell, A. D. Alexandria
Haskins, J. L. Moran
Hathaway, S. J. Minneapolis
Haugen, G. T. Fergus Falls
Haugen, O. N. Fergus Falls
Haverfield, Addie B. Minneapolis
Hawkins, E. P. Montrose
Hawkins, V. J. St. Paul
Hayes, J. M. Minneapolis
Hayes, M. F. Nashwauk
Haynes, F. E. Minneapolis
Head, G. D. Minneapolis
Health, A. C. St. Paul
Healy, R. F. Pierz
Hearn, Wm. O. Minneapolis
Hedback, A. E. Minneapolis
Hedblom, Carl A. Rochester
Hedding, J. A. Minneapolis
Hegge, C. A. Austin
Hegge, O. H. Austin
Helbert, J. P. Minneapolis
Heim, R. R. Minneapolis
Heimark, Jacob H. Moorhead
Helmholz, H. F. Rochester
Heimark, O. E. Duluth
Heise, W. F. C. Winona
Holland, G. W. Spring Grove
Holland, J. W. Spring Grove
Helk, H. H. Minneapolis
Hempstead, B. E. Rochester
Hempstead, Werner. St. Cloud
Henderson, A. G. Klester
Henderson, Melvin S. Rochester
Hendrickson, J. F. Minneapolis
Hengstler, W. H. St. Paul
Henriksen, H. G. New Market
Henry, C. E. Minneapolis
Hensel, C. N. St. Paul
Henslin, A. E. LeRoy
Herman, S. Welcome
Herrmann, E. T. St. Paul
Hertel, G. A. Austin
Heseltine, V. G. Taylors Falls
Hesselgrave, S. S. St. Paul
Heyersdale, Oscar. Rochester
Higgins, J. H. Minneapolis
Hilger, A. W. St. Paul
Hilger, D. D. St. Paul
Hilger, J. M. Iona
Hilger, L. A. Minneapolis
Hill, Eleanor J. Minneapolis
Hill, R. J. Minneapolis
Hirschboeck, F. J. Duluth
Hirschfield, Adolph. Minneapolis
Hirschfield, M. S. Duluth
Hitchings, W. P. Lakefield
Hobbs, C. A. Minneapolis
Hodge, S. V. Minneapolis
Hodgson, H. H. Crookston
Hoeh, Knut. Minneapolis
Hoff, Alfred. St. Paul
Hoff, Peder A. St. Paul
Hoffman, J. Henning
Hoidale, A. F. Tracy

Holland, A. S. Argyle
Holt, E. E. Detroit
Holbrook, John S. Mankato
Holcomb, J. F. St. Paul
Holcomb, O. W. St. Paul
Holdridge, G. A. Foley
Holen, T. Minneapolis
Holl, P. M. Minneapolis
Holley, Wallace W. Warren
Holm, Geo. A. Minneapolis
Holman, Carl J. Mankato
Holman, E. E. Pine River
Holmberg, L. J. Canby
Holmes, W. B. Ada
Holst, C. F. Little Falls
Holst, J. B. Little Falls
Holte, Halvor. Crookston
House, L. E. Cass Lake
Houston, C. A. Park Rapids
Hovde, H. Duluth
Howard, S. E. Rochester
Howard, W. S. St. Paul
Howe, A. W. Minneapolis
Huenekens, E. J. Minneapolis
Hunt, F. N. Fairmont
Hughes, L. D. Minneapolis
Hullis, H. E. St. Paul
Hulscher, Julian A. Mankato
Humphrey, E. W. Moorhead
Hundling, H. W. Rochester
Humphrey, W. R. Stillwater
Hunt, H. E. St. Paul
Hunt, R. C. Fairmont
Hunt, Verne C. Rochester
Hunte, A. F. Truman
Hursh, M. H. Grand Rapids
Hutchinson, C. J. Rochester
Huxley, E. R. Faribault
Hvoslef, Jacob. Minneapolis
Hyer, C. A. Rochester
Hynes, James. Minneapolis
Hynes, John E. Minneapolis
Ide, Arthur W. St. Paul
Ikeda, Kano. Minneapolis
Irvine, H. G. Minneapolis
Jacobs, A. C. Elmore
Jacobs, Jno. C. Winmar
Jacquat, G. L. Mankato
James, John H. Walnut Grove
Jamieson, Earl. Minneapolis
Jarvis, B. W. Minneapolis
Jellison, E. R. New Auburn
Jensen, J. C. Hendricks
Jensen, M. J. Minneapolis
Jensen, T. J. Duluth
Jesion, J. W. St. Paul
Johnson, A. C. Rochester
Johnson, A. E. Minneapolis
Johnson, A. E. Red Wing
Johnson, A. E. Minneapolis
Johnson, Asa M. St. Paul
Johnson, Carl E. Minneapolis
Johnson, C. M. Dawson
Johnson, Ellsworth. Windom
Johnson, E. W. Bemidji
Johnson, Geo. L. New Folden
Johnson, H. Kerchoven
Johnson, H. M. Dawson
Johnson, H. P. Fairmont
Johnson, Hartland C. St. Paul
Johnson, James. Minneapolis
Johnson, Julius. Minneapolis
Johnson, Morton T. Minneapolis
Johnson, Nimrod A. Minneapolis
Johnson, Odin J. Minneapolis
Johnson, O. V. Sebeka
Johnson, R. A. Minneapolis
Johnson, T. H. St. Paul
Jones, A. W. Red Wing
Jones, E. M. St. Paul
Jones, H. T. Rochester
Jones, H. W. Minneapolis
Jones, R. N. Gaylord
Jones, W. A. Minneapolis
Jopson, P. N. Rochester
Joseph, E. G. Rochester
Josowich, Alexander. Minneapolis
Joyce, I. M. Janesville
Joyce, George. Rochester
Judd, Edward S. Rochester
Judson, W. E. Duluth
Kabrick, O. A. Odin
Kahala, Arthur. Crookston
Kalinoff, D. Stillwater
Kamp, B. A. Albert Lea
Kannary, E. L. St. Paul
Kanne, C. W. Faribault
Karn, B. R. Ortonville
Kaufman, Wm. C. Appleton
Kean, N. D. Coleraine
Keating, Herman. St. Paul

Keeling, F. L. Lakefield
Kelsling, I. H. Hibbing
Keith, N. M. Rochester
Kelly, B. W. Aitkin
Kelly, John V. St. Paul
Kelly, Paul H. St. Paul
Kelsey, C. G. Hinckley
Kemp, Alphonse F. Mankato
Kennedy, C. C. Minneapolis
Kennedy, James. Minneapolis
Kennedy, R. R. Minneapolis
Kenyon, Paul. Wadena
Kern, M. J. St. Cloud
Kerrick, Stanley E. Minneapolis
Keyes, C. R. Duluth
Keyes, E. D. Winona
Kibbe, O. A. Canton
Kierland, P. E. Harmony
Kilbourne, Arthur F. Rochester
Kilbride, J. S. Canby
Kimball, H. H. Minneapolis
King, C. F. Rochester
King, E. J. Minneapolis
King, Walter E. St. Paul
King, W. R. Minneapolis
King, Wm. S. Eveleth
Kinsella, T. J. Rochester
Kirk, G. P. E. Grand Forks
Kirmse, Geo. W. Minneapolis
Kirsch, R. L. Crookston
Kistler, C. M. Minneapolis
Kistler, J. M. Minneapolis
Kittelsson, Theo. N. Fergus Falls
Kjelland, J. S.
East Ellsworth, Wis.
Klein, H. N. St. Paul
Klein, H. Duluth
Knauf, A. R. Rochester
Knauf, N. K. St. Paul
Knickerbocker, V. H. Staples
Knight, H. L. Minneapolis
Knight, R. R. Minneapolis
Knight, Ralph T. Minneapolis
Knights, F. A. Pequot
Knights, S. G. Randall
Koch, John C. Minneapolis
Kohlbray, C. O. Duluth
Kohler, F. G. Hector
Kohler, Geo. A. Minneapolis
Koller, H. M. Minneapolis
Koller, L. R. Minneapolis
Kolset, Carl D. Benson
Koons, K. M. Rochester
Kraft, P. Duluth
Kramer, G. B. St. Paul
Kremer, Walter J. Minneapolis
Kriedt, Daniel. Minneapolis
Kucera, Wm. J. Hopkins
Kuhlman, Aug. Melrose
Kuske, A. L. Minneapolis
Kuth, J. R. Duluth
Kvitrud, G. St. Paul
Laird, A. T. Nopeming
LaJoie, John M. Minneapolis
Lamb, Harold L. Sauk Center
Landeen, F. G. Stillwater
Landenberg, John. New Prague
Lane, Laura A. Minneapolis
Laney, R. L. Puporsky
Lange, A. E. Rochester
Langenderfer, F. V. St. Paul
Lannin, J. C. Mabel
La Pierre, C. A. Minneapolis
Larsen, C. O. St. Paul
Larson, O. L. Detroit
Laughlin, J. T. Grey Eagle
Laurent, A. A. Minneapolis
LaVake, R. T. Minneapolis
Law, A. A. Minneapolis
Leahy, B. St. Paul
Leavenworth, R. O. St. Paul
Leavitt, H. H. Minneapolis
Lebowske, Jos. A. Minneapolis
Leck, C. C. Austin
Le Clerc, J. E. Le Sueur
Lee, John W. Minneapolis
Lee, Thos. G. Rochester
Lee, W. A. Fergus Falls
Lee, W. N. Madison
Lee, W. P. Northfield
Leebens, J. H. Lismore
Leicht, O. Winona
Leigh, H. J. Lakefield
Leitch, Archibald. St. Paul
Leland, J. T. Herman
Leland, M. N. Minneapolis
Lennon, Willis S. Rochester
Lemstrom, Jarl. Minneapolis
Lenont, C. B. Virginia
Lepak, F. J. Duluth
Lepak, John A. St. Paul
Lerche, William. St. Paul
Lester, C. A. Winona

Leuty, Amos.....Morris
 Lewis, A. J.....Henning
 Lewis, C. R.....St. Cloud
 Lewis, E. J.....Sauk Center
 Lewis, J. B.....South St. Paul
 Lewis, J. D.....Minneapolis
 Lewis, W. W.....St. Paul
 Lexa, F. J.....Lonsdale
 Lichtenstein, H.....Winona
 Lick, C. Louis.....St. Paul
 Liebold, H. H.....Parkers Prairie
 Liedloff, Adolph G.....Mankato
 Lillie, Harold L.....Rochester
 Lillie, Walter I.....Rochester
 Lima, Ludwig.....Montevideo
 Lind, C. J.....Minneapolis
 Linde, Herman.....Cyrus
 Lindgren, E. I.....Duluth
 Lindsay, W. V.....Winona
 Linneman, N. L.....Duluth
 Linner, H. F.....Minneapolis
 Linton, W. E.....Rochester
 Lippman, H. S.....Rochester
 Litchfield, John.....Minneapolis
 Little, W. J.....St. Paul
 Litzenberg, J. C.....Minneapolis
 Lloyd, Hiram J.....Mankato
 Locken, O. E.....Crookston
 Logan, Archibald H.....Rochester
 Logan, F. W.....Blue Earth
 Logefiel, Rudolph.....Minneapolis
 Lomman, P. A.....Austin
 Long, Jesse.....Minneapolis
 Long, W. H.....Rochester
 Loofbourrow, E. H.....Keewatin
 Loomis, E. A.....Minneapolis
 Love, Fred A.....Carlos
 Love, Geo. A.....Preston
 Lowe, L. M.....Glyndon
 Lowe, Thos.....Pipestone
 Lowe, Thos. A.....Pipestone
 Luedtke, G. H.....Fairmont
 Lufkin, H. M.....St. Paul
 Lum, C. E.....Duluth
 Lundgren, A. C.....Minneapolis
 Lundholm, A. M.....St. Paul
 Lynam, F.....Duluth
 Lynch, G. V.....Rochester
 Lynch, J. L.....Winona
 Lynch, N. J.....Minneapolis
 Lyng, John.....Minneapolis
 Lynn, J. F.....Waseca
 Lyon, J. D.....Minneapolis
 Lyons, Horace R.....Rochester
 Lysne, Henry.....Minneapolis

MacDonald, D. A.....Minneapolis
 MacLaren, Archibald.....St. Paul
 McAuliffe, J. A.....Duluth
 McCann, D. F.....Bemidji
 McCarthy, Donald.....Minneapolis
 McCarthy, Paul D.....Babitt
 McCarthy, W. J.....Madelia
 McCarthy, W. R.....St. Paul
 McCartney, J. S.....Minneapolis
 McClanahan, J. H.....White Bear
 McClanahan, T. S.....White Bear
 McClood, C. N.....St. Paul
 McComb, C. F.....Duluth
 McCormick, Thos. F.....St. Paul
 McCorvie, J. E.....Rochester
 McCoy, J. E.....Ivanhoe
 McCoy, Mary.....Duluth
 McCrea, Jas.....Fulda
 McDaniel Oriana.....Minneapolis
 McDavitt, Thomas.....St. Paul
 McDermott, T. E.....Minneapolis
 McDonald, A. F.....Minneapolis
 McDonald, A. L.....Duluth
 McDonald, H. H.....Minneapolis
 McDonald, I. C.....Minneapolis
 McDougald, D. W.....Le Sueur
 McDowell, J. P.....St. Cloud
 McEachran, A.....Minneapolis
 McFarland, Arthur H.....Minneapolis

McGiffert, E. N.....Duluth
 McGroarty, J.....Eaton
 McGuigan, H. F.....Red Wing
 McGuire, L. D.....Rochester
 McHaffie, O. L.....Duluth
 McHugh, R.....Aitkin
 McIntire, H. M.....Waseca
 McIntyre, E. H.....Virginia
 McIntyre, Geo.....Minneapolis
 McKeon, Owen.....St. Paul
 McKeown, E. G.....Pipestone
 McKibben, W. E.....St. Cloud
 McKinney, F. S.....Minneapolis
 McLaren, Jeanette M.....St. Paul
 McLaughlin, E. M.....Winona
 McLaughlin, James A.....Minneapolis
 McNevin, C. F.....St. Paul

McPheeters, N. O.....Minneapolis
 Macnie, John.....Minneapolis
 Maertz, W. F.....New Prague
 Magath, T. B.....Rochester
 Magie, W. H.....Duluth
 Magney, F. H.....Duluth
 Magnuson, Herman V.....Bell, Cal.
 Maikan, M. H.....Fairmont
 Maland, D. O.....Minneapolis
 Maloney, T. J.....St. Paul
 Manley, J. R.....Duluth
 Mann, A. T.....Minneapolis
 Manson, F. M.....Worthington
 Marcle, W. J.....Minneapolis
 Maquire, Leo.....Minneapolis
 Marcum, E. H.....Bemidji
 Mariette, E.....Minneapolis
 Mark, Arthur E.....St. Paul
 Mark, D. E.....Minneapolis
 Martin, E. T.....Marble
 Martin, T. R.....Duluth
 Martineau, J. L.....St. Paul
 Masson, D. M.....Rochester
 Masson, James C.....Rochester
 Mastin, Edward V.....Rochester
 Mathews, Justus.....Minneapolis
 Mattill, P. M.....Chisholm
 Maurer, E. L.....Brownton
 Maxelner, Stanley R.....Minneapolis
 May, C. C.....Adrian
 May, C. E.....Minneapolis
 May, W. H.....Minneapolis
 Mayland, M. L.....Faribault
 Mayo, Charles H.....Rochester
 Mayo, W. J.....Rochester
 Mead, Marion A.....Minneapolis
 Mee, P. H.....Osseo
 Meckstroth, C. N.....Brandon
 Meeker, W. R.....Rochester
 Meierding, Wm. A.....Springfield
 Meighan, J. W.....Ulen
 Meland, O. N.....Warren
 Melby, B.....Bloomington
 Melby, O. F.....Thief River Falls
 Melson, Oliver C.....Rochester
 Melzer, G. R.....Lyle
 Merkert, G. L.....Minneapolis
 Merriman, L. L.....Duluth
 Merrill, James E.....Amboy
 Mesker, G. H.....Olivia
 Metcalf, F. W.....Worthington
 Metcalf, J. N.....Monticello
 Meyer, E. L.....Minneapolis
 Meyerding, E. A.....St. Paul
 Meyerding, Henry W.....Rochester
 Meyers, Thos.....St. Paul
 Michael, J. G.....Minneapolis
 Michaelson, H. E.....Minneapolis
 Michaelson, Henry E.....Minneapolis

Miller, F. C.....Minneapolis
 Miller, H. A.....Waseca
 Miller, Victor.....Mankato
 Miller, W. A.....New York Mills
 Millsbaugh, J. G.....Little Falls
 Mingo, F. E.....Hugo
 Mitchell, Frederick.....St. Paul
 Mitchell, J. I.....Rochester
 Moersch, Frederick P.....Rochester
 Moersch, H. J.....Rochester
 Moffatt, A. G.....Howard Lake
 Mogilner, S. N.....St. Paul
 Moir, Wm. W.....Minneapolis
 Molander, H. A.....St. Paul
 Moloney, G. R.....Belle Plaine
 Molzahn, Herman E.....St. Paul
 Monahan, J. A.....Minneapolis
 Moore, Alex. B.....Rochester
 Moore, T. D.....Rochester
 Moorehead, M. B.....Minneapolis
 Mork, B. O.....Worthington
 More, C. W.....Eveleth
 Morehouse, G. G.....Owatonna
 Morell, W. N.....Verndale
 Moren, Ed.....Minneapolis
 Morley, G. A.....Crookston
 Morris, E. H.....Austin
 Morris, R. Edwin.....St. Paul
 Morrison, A. W.....Minneapolis
 Morrissey, F. B.....St. Paul
 Morse, C. R.....Hibbing
 Morse, John H.....Minneapolis
 Morse, M. P.....Le Roy
 Morse, W. E. H.....Morristown
 Morsman, C. F.....Hibbing
 Mortensen, N. G.....St. Paul
 Morton, H. McI.....Minneapolis
 Moses, Joseph, Jr.....Northfield
 Moynihan, And. P.....Sauk Center
 Moynihan, T. J.....St. Paul
 Mulder, John L.....Cavaler, N. D.
 Murphy, E. F.....St. Paul
 Murphy, I. J.....Minneapolis
 Murphy, L. T.....Rochester

Murray, D. D.....Duluth
 Murray, Wm. R.....Minneapolis
 Mussey, Robert D.....Rochester
 Myers, J. A.....Minneapolis
 Naegeli, Frank.....Fergus Falls
 Nannestad, J. R.....Albert Lea
 Nass, H. A.....Mabel
 Nauth, W. W.....Winona
 Neher, F. H.....St. Paul
 Nelson, C. A.....Owatonna
 Nelson, E. H.....Chisholm
 Nelson, H. E.....Crookston
 Nelson, H. S.....Minneapolis
 Nelson, M. S.....Spring Grove
 Nelson, Nesmith.....Brainerd
 Nelson, N. A.....Dawson
 Nelson, L. A.....St. Paul
 Nelson, O. E.....Minneapolis
 Nelson, O. N.....Battle Lake
 Nerad, A. H.....Argyle
 Neuman, C. A.....St. Charles
 New, Gordon B.....Rochester
 Newhart, Horace.....Minneapolis
 Newman, G. A.....Stillwater
 Nichols, A. E.....St. Paul
 Nicholson, Jos.....Brainerd
 Nicholson, M. A.....Duluth
 Niesbaum, W. H.....Jackson
 Nippert, H. T.....St. Paul
 Nippert, L. A.....Minneapolis
 Nixon, Chas. E.....Minneapolis
 Noice, Russell R.....Minneapolis
 Noonan, Dan F.....Minneapolis
 Noran, A. N.....Minneapolis
 Nordin, C. G.....Brainerd
 Nordin, G. T.....Minneapolis
 Nordland, Martin.....Minneapolis
 Norman, J. F.....Crookston
 Norris, E. H.....St. Paul
 Noth, H. W.....St. Paul
 Novak, Edw. E.....New Prague
 Nye, Katherine A.....St. Paul

O'Brien, H. J.....St. Paul
 O'Connor, D. C.....Eden Valley
 O'Donnell, D. M.....Ortonville
 O'Donnell, J. E.....Minneapolis
 O'Hara, J. J.....Janesville
 O'Leary, Paul A.....Rochester
 Oberg, C. M.....Minneapolis
 Oertling, Harry.....St. Paul
 Ogden, B. H.....St. Paul
 Ohage, Justus, Jr.....St. Paul
 Ohlinger, Lorin B.....Rochester
 Oliver, C. I.....Graceville
 Ohnstad, J.....McIntosh
 Olson, Chas. A.....St. Paul
 Olson, Frederick A.....Minneapolis
 Olson, G. M.....Minneapolis
 Olson, O. H.....Erskine
 Olson, Olaf A.....Minneapolis
 Olson, R. G.....Minneapolis
 Olson, W. P.....Gaylord
 Onsgard, C. K.....Halstad
 Onsgard, L. K.....Houston
 Opheim, O. V.....Starbuck
 Oppegaard, M. O.....Crookston
 Oredson, O. A.....Duluth
 Orton, H. N.....Minneapolis
 Osborne, Lida.....Mankato
 Osborne, E. D.....Rochester
 Osburn, Burt O.....Internat'l Falls
 Ostergren, E. W.....St. Paul
 Otto, H. C.....Frazee
 Ott, William.....Rochester
 Overend, K. S.....Hallowell
 Owre, Oscar.....Minneapolis

Pake, S. G.....Duluth
 Palmer, W. L.....Albert Lea
 Paradine, J.....Duluth
 Pardee, K.....Rochester
 Pare, L. T.....Duluth
 Parker, B. R.....Rochester
 Parker, E. H.....Minneapolis
 Parker, H. L.....Rochester
 Parker, O. W.....Ely
 Parks, A. H.....Minneapolis
 Parrott, B. W.....Long Prairie
 Parsons, Geo. E.....Elk River
 Passer, A. A.....Olivia
 Patterson, C. H.....Barnesville
 Patterson, W. E.....Minneapolis
 Patterson, W. L.....Fergus Falls
 Patterson, W. E.....Westbrook
 Paulson, E. W.....North Branch
 Paulson, E. L.....Minneapolis
 Paulson, Theo.....Fergus Falls
 Payette, C. H.....Duluth
 Pearce, N. O.....Minneapolis
 Pearson, F. R.....St. Paul
 Pedersen, A. H.....St. Paul
 Pederson, R. M.....Minneapolis

Peland, F. J. New Ulm
 Pemberton, John de J. Rochester
 Pengelly, E. J. Ironton
 Penhall, F. W. Morton
 Pennie, D. F. Duluth
 Peppard, T. A. Minneapolis
 Perkins, John W. Sanborn
 Perry, C. G. St. Paul
 Perry, Ralph St. John. Minneapolis
 Persons, C. E. Marshall
 Peterson, Alfred. Dassel
 Peterson, C. Owatonna
 Peterson, H. E. Granite Falls
 Peterson, J. R. Minneapolis
 Peterson, O. N. Minneapolis
 Peterson, R. A. Vesta
 Peters, R. M. Minneapolis
 Peterson, Thorvald. Minneapolis
 Peterson, V. N. St. Paul
 Pettit, C. W. Minneapolis
 Peyton, Wm. L. Minneapolis
 Phelps, A. E. Ogilvie
 Phelps, Kenneth A. Minneapolis
 Phelps, R. M. St. Peter
 Phillips, A. E. Delano
 Phillips, J. G. Northfield
 Phillips, Wm. H. Jordan
 Pierce, Alias H. Wadena
 Pilon, P. C. Paynesville
 Pine, Auten A. St. Paul
 Pineo, W. P. Minneapolis
 Piper, Monte C. Rochester
 Piper, Wm. A. Mountain Lake
 Platt, J. J. St. Paul
 Plondke, F. J. St. Paul
 Plonske, G. J. Faribault
 Plummer, H. S. Rochester
 Plummer, W. A. Rochester
 Poehler, F. T. Minneapolis
 Poirier, J. A. Forest Lake
 Pollock, Lee W. Rochester
 Pool, Daniel. St. Paul
 Poppe, F. H. Minneapolis
 Fortman, W. C. Jackson
 Fowell, L. D. Rochester
 Powers, F. W. Barrett
 Prangen, Avery D. Rochester
 Pratt, Chelsea C. Mankato
 Pratt, Fred J. Minneapolis
 Pratt, J. A. Minneapolis
 Preine, Irvin A. Minneapolis
 Prim, J. A. Minneapolis
 Pritchard, D. B. Winona
 Proctor, O. S. Rochester
 Puffer, F. L. Bird Island
 Putney, Geo. W. Paynesville
 Quinby, Thos. F. Minneapolis
 Quist, Henry W. Minneapolis
 Raadquist, C. S. Hibbing
 Radabaugh, R. C. Hastings
 Raihala, J. Virginia
 Rains, John M. Wilmar
 Raiter, Franklin W. S. Cloquet
 Ramsey, W. R. St. Paul
 Ramson, L. M. Hancock
 Rankin, A. A. Zumbro Falls
 Rankin, F. W. Rochester
 Ratcliffe, J. J. Aitkin
 Rathburn, A. M. Rice
 Rathburn, C. A. Sauk Rapids
 Ravu Bjarne. Minneapolis
 Reed, Chas. E. Minneapolis
 Rees, S. P. Minneapolis
 Reeve, E. T. Elbow Lake
 Reeves, C. F. Eagle Bend
 Reimer, E. W. Breckenridge
 Reiter, H. W. Shakopee
 Renshaw, K. Rochester
 Replogle, W. H. Wabasha
 Reynolds, H. Hibbing
 Reynolds, J. S. Minneapolis
 Rice, G. D. St. Cloud
 Rice, G. E. Rochester
 Richards, E. T. F. St. Paul
 Richardson, W. E. Pipestone
 Richardson, W. J. Fairmont
 Richmond, Chas. D. Jeffers
 Ridgeway, Alex. Belgrade
 Ridgway, A. M. Annandale
 Riggs, C. Eugene. St. Paul
 Rippert, J. A. Proctor
 Rishmiller, J. H. Minneapolis
 Risser, E. D. Winona
 Ritchie, H. P. St. Paul
 Rizor, B. J. Minneapolis
 Rhines, D. C. Caledonia
 Roan, Carl M. Minneapolis
 Robbins, C. P. Winona
 Roberts, L. M. Little Falls
 Roberts, Thos. S. Minneapolis
 Roberts, W. D. Minneapolis

Robertson, A. W. Litchfield
 Robertson, J. B. Cottonwood
 Robertson, W. P. Litchfield
 Robilliard, C. M. Faribault
 Robilliard, W. H. Faribault
 Robinson, J. M. Duluth
 Robitshek, E. C. Minneapolis
 Rochford, W. E. Minneapolis
 Rockwell, D. C. Rochester
 Rodda, F. C. Minneapolis
 Rodgers, C. L. Minneapolis
 Rogers, F. D. St. Paul
 Rogers, John T. St. Paul
 Roholt, C. L. Waverly
 Rood, D. C. Hibbing
 Roodman, L. M. Ponsford
 Rose, J. F. Lakefield
 Rosen, S. Minneapolis
 Rosenberry, B. P. Winona
 Rosenow, Edward C. Rochester
 Rosenwald, R. M. Minneapolis
 Ross, J. W. Rochester
 Rosseau, Victor. Maple Lake
 Rothenburg, J. C. Springfield
 Rothrock, J. L. St. Paul
 Rothschild, H. J. St. Paul
 Rowe, O. W. Duluth
 Rowe, W. H. St. James
 Rowley, Walter. Rochester
 Rowntree, L. S. Rochester
 Roy, J. A. Stephen
 Roy, Philemon. St. Paul
 Rudie, P. S. Duluth
 Rumpf, W. H. Faribault
 Rutherford, W. C. St. Paul
 Russell, Herman R. Stewartville
 Rutledge, L. H. Detroit
 Ryan, John J. St. Paul
 Ryan, J. W. Duluth
 Rypins, Harold. Minneapolis
 St. Clair, G. G. Duluth
 Saam, J. G. Eveleth
 Sanford, A. H. Rochester
 Sargeant, H. L. Dalton
 Satersmoen, Theo. Polican Rapids
 Sather, E. R. Spring Valley
 Sawatzka, Wm. A. Minneapolis
 Sawyer, P. Goodhue
 Savage, F. J. St. Paul
 Schaaf, F. H. K. Minneapolis
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